THE UNIVERSITY OF ALBERTA

AN EVALUATION OF THE MULTIPLIER EFFECT AT SLAVE AND IN ITS TRIBUTARY AREA SINCE THE ESTABLISHMENT OF THE LESSER SLAVE LAKE SPECIAL INCENTIVES AREA.

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled An Evaluation of the Multiplier Effect at Slave and in its Tributary Area Since the Establishment of the Lesser Slave Lake Special Incentives Area.

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ABSTRACT

This study deals with the distributional impact of the Lesser Slave Lake Special Area Program administered by the Federal Department of Regional Economic Expansion and the Alberta Government with particular reference to the incidence of direct and indirect income and employment benefits both spatially and to specific groups within the program region. The effectiveness of the growth centre approach to regional development, which is explicitely embodied in the Special Area Program, is examined with reference to the attainment of program goals relating to the distribution of benefits. Secondary induced investment, induced interindustry linkage effects and the impact of the program on the fiscal structure of local government are considered. A traditional economic base-type multiplier model is used to estimate the aggregate indirect income and employment effects of the program. A markov chain type model is used to simulate the distributional impact of the multiplier process generated by consumer spending out of the directly program induced payroll. It is shown from the analysis that the spread impact of the program within the region is extremely limited with respect to both direct and indirect benefits. The distribution of indirect income benefits tends to be in favor of the higher income groups. Secondary employment creation effects from interindustry linkages are small. The program has induced heavy in-migration as a result of severe

labour shortages, exacerbated by the shortage of housing, and has thus by-passed many long term residents. The fiscal capacity of the designated growth centre of Slave Lake where developmental efforts have been concentrated has been strained to the point of causing severe dislocation of the local economy. The induced industrial structure, which is based on wood products, appears to be fragile as a result of the soft lumber market and offers few opportunities for employees to advance within the occupational structure of the firms involved. However, it appears that native peoples have made significant gains as a result of the program. The Lesser Slave Lake Program affords a good case study from which the regional policy maker and the model builder can learn.

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CHAPTER I

INTRODUCTION

The Problem

Both regional development policy and theory have been concerned traditionally with questions relating to inter-regional equality. In contrast, scant attention has been given to intra-regional equity considerations. More particularly there have been few attempts to investigate the distributional impact of regional development programs through the multiplier process, with respect to the incidence of benefits either spatially or to target groups within backward regions. These considerations are important for two reasons.

Firstly, a program in a backward region which induces heavy in-migration may raise per capita income of the region concerned but leave the welfare of the original inhabitants unchanged.[1] In fact, local welfare may be reduced within a region with limited potential to expand its output of goods and services. For example increased demand for accommodation may raise the price of housing to the local population, a heavy strain may be placed on existing social overhead capital and public services, and, it is argued, with regard to the increased marginal cost of expanding local public sector output the

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[1] In terms of strict Pareto optimality this might not be considered important since in raising the net welfare of the region, the welfare of any particular group is not reduced absolutely.

in-migrant pays only the average cost.[2] Therefore, since labor is mobile between regions it is important to distinguish between the region and the people involved when considering equity effects.[3]

Secondly a policy of developing growth centres in backward regions, which the conventional wisdom states is the most effective approach to reducing inter-regional disparities, may increase income inequalities within regions as a result of geographical and occupational accessibility problems faced by hinterland residents in filling employment positions created in growth centres. Migration from the hinterland to the growth centres may be limited further if place preference and kinship ties rank high in the social values of the hinterland population. In addition, linkages between industry located at the growth centre and activities in the hinterland may be limited. Therefore, little expansion may be induced in the hinterland by concentrating developmental efforts in growth centres.

Geographers have contributed very little to the study of equity at either the inter-regional or intra-regional level despite the fact that the question of distributional equity has an important spatial dimension. This gap indicates a need for a welfare oriented approach to the geographical study of regional development since this appears to be the direction in

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[2] H.W. Richardson [43], p. 123.

[3] W. Alonso [12], p. 51.

which both theory and policy are moving.

In the context of federal regional policy in Canada there are two reasons which suggest that distributional equity considerations are integral to the analysis of the impact of regional development programs administered by the Department of Regional Economic Expansion (DREE): First, the increasing concern with the targeting of program benefits to specific groups, and second, DREE's commitment to the growth centre strategy of regional development.

Traditional approaches to multiplier impact analysis are considered here to be inadequate for the evaluation of regional development programs when the distribution of benefits is central to developmental goals since these fail to identify who benefits from such programs.

The multiplier process has been emphasized as an important policy tool by DREE. With reference to the Regional Development Incentives Program which operates in Special Areas and other designated regions DREE relies upon ". . . a positive response by entrepreneurs to establish, expand and modernize manufacturing and processing industries yielding a type and scale of development which through multiplier effects will produce economic strength, higher wage rates and other foundations for social adjustment".[4] However the fact is that very little

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[4] Department of Regional Economic Expansion [29], p. 3.

is known about the equity effects generated by the multiplier. The evaluation of regional development programs which involve heavy commitments of public funds is clearly an essential line of research with important implications for both policy and theory.

Study Objectives

The main objective of this study was to measure and evaluate the multiplier impact on income and employment of the Lesser Slave Lake Special Area Program administered jointly by DREE and the Alberta Government. Two aspects of this impact were considered:

1. the aggregate income and employment multiplier effects of the program, and
2. the incidence of direct and indirect income and employment benefits spatially and to different groups within the program region.

A secondary set of objectives in the evaluation relate to the industrial structure induced by DREE and the impact on the public sector. These were:

a. to establish the relationship between DREE induced industry and existing industries;
b. to establish the significance of linkages between DREE induced industries;
c. to establish the potential for additional linkages given the induced industrial structure;

d. to establish secondary public sector investment induced by the program; and

e. to establish the impact of the program on the fiscal position and fiscal structure of local government.

The analysis is intended to provide a basis for evaluating current policy and for developing specific policy guidelines for future development in the region. The Lesser Slave Lake program represents a good case study since it is likely to become a model for developmental programs in resource frontier areas elsewhere based on the growth centre approach.

Study Area

The study area was limited to the town of Slave Lake, a designated growth centre in the Special Area, and the surrounding hinterland. The reasons for this delineation were the time and cost constraints on the study which determined that emphasis should be placed on this particular part of the Special Area since the main impact of the program in terms of investment in infrastructure and industrial development has been concentrated in this area. In addition it comprises a substantial part of the key problem area in the program region recognized by DREE.[5]

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[5] Department of Regional Economic Expansion [28].

The Special Areas Program[6]

Inter-regional disparities in incomes and the availability of productive employment have constituted an increasingly important policy issue in Canada since 1945. During the 1950s and 60s the Canadian economy as a whole grew rapidly with a compounded annual growth rate of 7.6 per cent. It is well known however that all regions did not share equally in this expansion which thus served to emphasize the existence and persistent nature of inter-regional disparities.

A major phase of federal regional policy followed the recession of the late 1950s. Programs were introduced to deal with poverty and problems of land utilization in rural areas, the development of social overhead capital and industrial infrastructure in the Atlantic Provinces and industrial development incentives were made available in designated areas (Area Development Incentives Act, 1963). These policies were introduced on an ad hoc basis to meet the needs of specific situations and particular aspects of the programs were administered by different government agencies, which undoubtedly reduced their effectiveness. The failure of these programs to reduce disparities significantly indicated a need for a more effective regional policy, a need which was finally recognized in the late 1960s and which resulted in the creation of the federal Department of Regional Economic Expansion in 1969. This agency assumed

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[6] For a discussion of Canadian Regional Policy to the late 1960's see T.N. Brewis [19].

responsibility for various provincial developmental projects[7] and took over the functions of a number of existing federal departments. Discretionary capital incentives to encourage industrial expansion in certain lagging regions were introduced under the Regional Development Incentives Act (RDIA) which replaced the non-discretionary grant system of the Area Development Incentives Program. It was recognized however that certain areas lacked the basic infrastructure and services required to attract industry and support growing populations. Therefore after consultations with the provincial governments involved, DREE designated a number of Special Areas in which joint federal, provincial and municipal action is being undertaken over a five year period.

Under the Special Areas Program DREE may:[8]

1. provide grants and loans to a province for essential infrastructure to make growth centres attractive for industrial development and to support population growth;
2. make incentives available to primary and tertiary activities where DREE considers that these will contribute significantly towards employment creation in the region. Assistance under the RDIA Program is

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[7] These included the Agriculture and Rural Development Act, the Prairie Farm Rehabilitation Act and the Area Development Incentives Act.

[8] Department of Regional Economic Expansion [26].

restricted to secondary processing and manufacturing industry;

3. provide in Special Areas the same incentives available to secondary industry in regions designated under the RDIA Program;
4. undertake social programming in cooperation with the provinces and other federal departments to assist local people in taking advantage of employment opportunities created.

DREE intervention in Special Areas is intended to ". . . promote and to a degree concentrate economic activity in industrial growth centres in an attempt to accelerate area-wide (emphasis author's) economic developments".[9] The effectiveness of this strategy in reducing disparities between regions and without increasing them within regions depends on the relative magnitudes of intra-regional spread and polarization effects together with non-local multiplier effects since these fundamentally influence the spatial and sectoral transmission of growth. Some insights into the operation of these processes are given in Chapter II.

The Lesser Slave Lake Program and Region

It is unnecessary to provide the standard type of regional description or an overview of the Lesser Slave Lake Program

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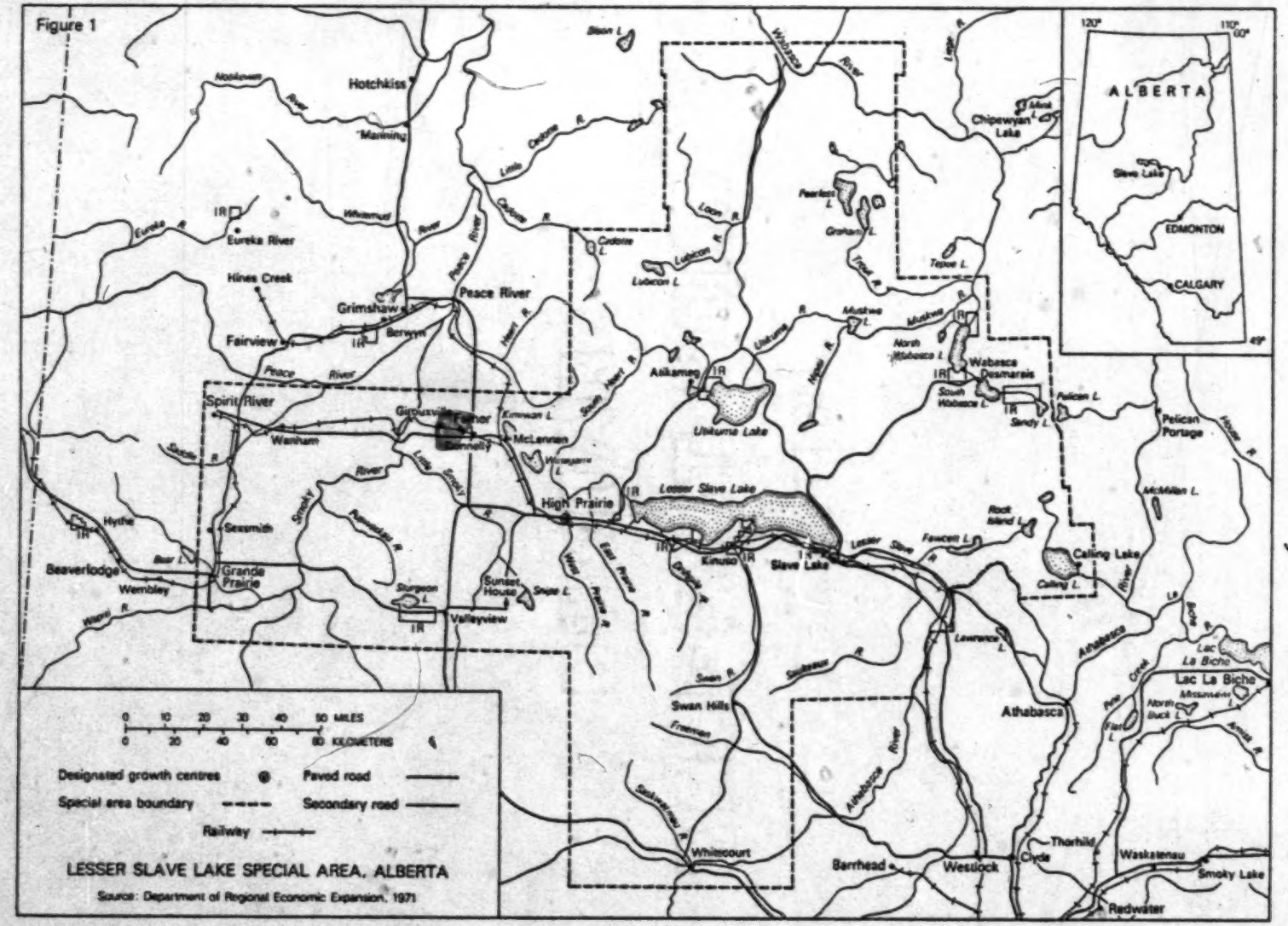
[9] Department of Regional Economic Expansion [29], p. 3.

Figure 1


ALBERTA
EDMONTON
CALGARY
Hotchkiss
Manning
Eureka River
Hines Creek
Grimshaw
Peace River
Berwyn
Fairview
Spirit River
Wanham
Grande Prairie
Beaverlodge
Wembley
Hythe
Sexsmith
Valleyview
Sunset House
High Prairie
McLennan
Lesser Slave Lake
Slave Lake
Kinuso
Utikuma Lake
Assumption
Wabasca Desmarais
Chipewyan Lake
Pelican Portage
Calling Lake
Athabasca
Lac La Biche
Swan Hills
Whitecourt
Barrhead
Westlock
Clyde
Thorhild
Waskatenau
Smoky Lake
Redwater
0 10 20 30 40 50 MILES
0 20 40 60 80 KILOMETERS
Designated growth centres
Special area boundary
Railway
Paved road
Secondary road
LESSER SLAVE LAKE SPECIAL AREA, ALBERTA
Source: Department of Regional Economic Expansion, 1971

here since these subjects have been covered fully elsewhere.[10] However it would be useful for the purposes of this study to outline some of the area's internal functional relationships, economic problems in the region at the time of designation, and the major objectives and developmental aspects of the program.

The Region

A general three-fold division of the program region (Figure 1) is recognized by DREE:[11]

1. a central core extending north from High Prairie and Slave Lake,
2. an extension west including Grande Prairie,
3. an extension south to include Whitecourt.

The following discussion will be restricted to the core area since it is the geographical focus of interest in this study and the key problem area in the region.

The central core has an estimated population of 16,000 almost half of whom are native peoples. The western part of the core centred on High Prairie exhibits a relatively well developed central place structure comprising a number of functional regions. The centres perform service functions for a large, evenly distributed and largely agricultural population. In

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[10] See G. Banta [15]; Alberta Department of Agriculture [2]; Department of Regional Economic Expansion [26, 27, 28]; Alberta Office of Program Coordination [9, 10]; and Alberta Department of Municipal Affairs [5].

[11] Department of Regional Economic Expansion [28], pp. 2-4.

contrast the eastern part of the core is dominated by a single centre, Slave Lake, which serves a functionally loose tributary area with a small, unevenly distributed population. The low population density in the town's hinterland results from the general absence of agricultural activity, a traditional part of the wider region's economic base, which is heavily concentrated in the western core area.

The problems of the core at the time of designation hinged on fundamental weaknesses in the local economy of the hinterland which was based on fishing, hunting, trapping, mink ranching and farming. These traditional activities had been declining for a number of years and were clearly incapable of sustaining the area's rapidly growing population. Therefore, not surprisingly, the area was characterized by high levels of unemployment and underemployment, a heavy dependence on seasonal employment, low average per capita incomes about a third below the provincial average, a high incidence of welfare, and a low labour force participation rate, largely because of the extremely low participation rate for women estimated to be 4:1 compared with the provincial average of 2.8:1. Also as a result of the highly diffuse nature of population distribution in the core area as a whole and the associated limited fiscal capacity of the numerous small settlements, the quality of public infrastructure and services was extremely poor. The two major centres in the area, High Prairie and Slave Lake, both had lagging economies and weak fiscal positions at the time of designation. High

Prairie, an agricultural service centre, had demonstrated greater stability than Slave Lake, a centre for oil and gas well servicing in the region.

Figure 2 illustrates that the Lesser Slave Special Area has consistently lagged behind Alberta as a whole with respect to growth in per capita income, which is a reasonable indicator of well-being. The wide disparities between regions in the province, particularly the metropolitan core, for example the Edmonton region (CD11) and northern Alberta, for example CD15, are also clearly evident. It is apparent that incomes in the Southern Incentives Region have risen sharply since the introduction of the Regional Development Incentives Program in 1969. It would seem valid to assume a similar impact in the Lesser Slave Lake Special Area will occur, but such trends should not be projected. Figure 2 also indicates that the Lesser Slave Lake Special Area is not the most disadvantaged region in that part of northern Alberta. Census Division 15 as a whole exhibits lower per capita incomes, indicating that the program region does not encompass the most disadvantaged parts of north east Alberta.

It is apparent that up to the time of designation the problems of the Special Area were heavily concentrated in the hinterland. This has important implications for the success of the program since a growth centre strategy could widen rather than narrow existing intra-regional disparities in income if the program fails to integrate the hinterland population.

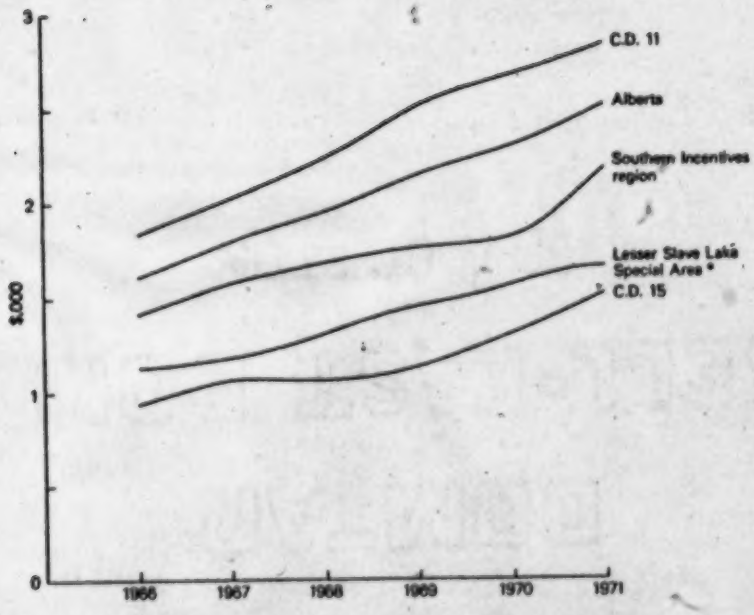

Figure 2
PER CAPITA TAXABLE AND NON-TAXABLE INCOME SELECTED REGIONS OF ALBERTA 1966-1971

Source: A.B.S. (1973)
* Taxation Statistics, Dept. of National Revenue (1971)

Table 1 shows that wide intra-regional disparities in income existed in the program region prior to designation.

TABLE I

Income as a Percentage of the Alberta Average

Towns	1966	1971	Percentage Income Growth Rate 1966-71
Slave Lake Region	77.4	81.2	40.2
Grouard	50.5	61.6	63.0
High Prairie	71.3	71.8	34.6
Swan Hills	134.3	132.5	31.9
Canyon Creek	54.0	61.8	52.9
Kinuso	75.3	70.4	25.1
Slave Lake Town	102.2	88.9	16.3
Desmerais	-	60.0	-
McLennan	75.8	85.7	51.0
Sexsmith	172.0	143.0	29.5
Grande Prairie	109.4	135.7	70.9

Source: Taxation Statistics, Department of National Revenue, 1971.

Figure 3 indicates important differences between patterns of income growth in communities of different sizes within the Special Area. The small hinterland communities tend to have low fluctuating patterns of income growth, reflecting the instability of economies based on small scale primary resource activities such as fishing, hunting, and trapping. In the case

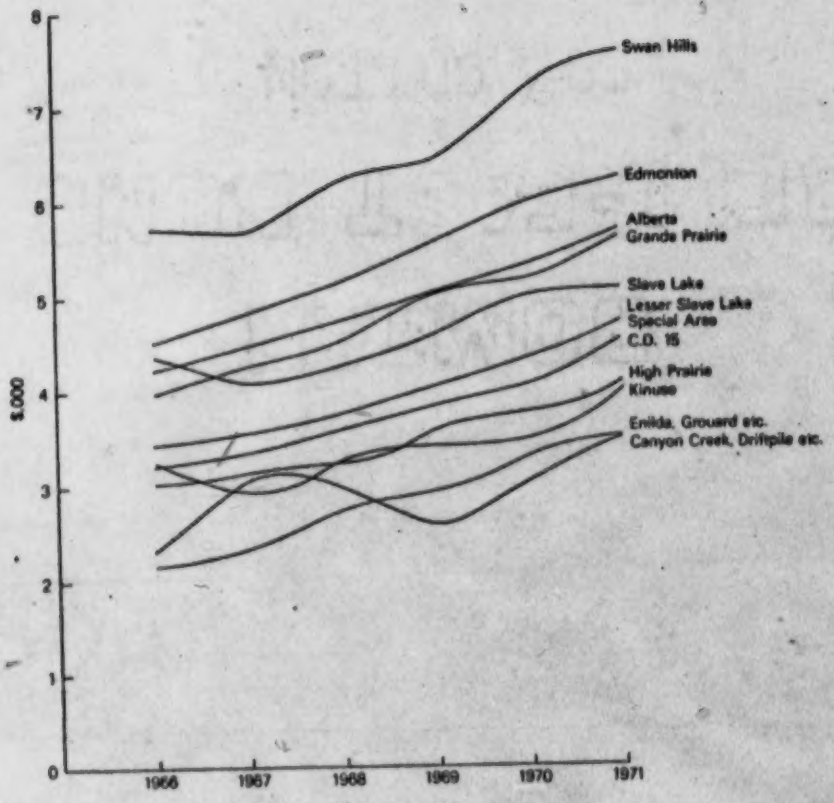

Figure 3
AVERAGE TAXABLE AND NON-TAXABLE INCOME
1966-1971

Source: Taxation Statistics, Dept. of National Revenue (1971)

of the 'South Shore' communities fluctuations in the market for mink pelts have contributed significantly to unstable income growth. Larger centres, for example High Prairie, Slave Lake and Grande Prairie exhibit relatively stable patterns of growth in income.

The Program

The Lesser Slave Lake region was designated as a Special Area in April, 1970. Two fundamental problems were recognized at that time which had serious implications for the region's ability to attract industry:

1. the lack of essential infrastructure, and
2. uncertainties regarding the region's locational situation and the use of untrained local labour.

The DREE/Alberta Joint Planning Committee established the following objectives at the initial programming stage:[12]

1. to create long term employment for established area residents;
2. to assist local people in gaining access to the employment opportunities created;
3. to provide assistance for the development of High Prairie and Slave Lake as the major growth centres in the core area;
4. to diversify the economic bases of these centres in

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[12] Department of Regional Economic Expansion [28], pp. 9-10.

order to minimize the effects of cyclical disturbances and structural change;

5. to encourage the development of major industries in Grande Prairie and the Whitecourt area to provide additional sources of employment for people within the core area.

The selection of such small centres as High Prairie (population 2,354, 1971), and Slave Lake (population 2,052, 1971), on which to build a growth centre strategy for regional development is interesting since it is usually argued that it is too costly to develop such centres to a scale at which they would generate significant spread effects and achieve self-sustained growth. This raises a difficult efficiency question and an efficiency versus equity issue of considerable importance. These will be discussed in Chapter II.

The program provides for three types of developmental programming designed to meet the objectives set out above:

1. Incentive grants: DREE incentives activity in the Special Area is summarized in Table II. Developmental efforts have been heavily concentrated in the wood products sector, 92.5 per cent of total incentives grants having been allocated to this sector which is based primarily on plants located at Mitsue Industrial Park.

2. Infrastructure: Major DREE funded infrastructure projects in the Special Area have been concentrated in Slave Lake/Mitsue Industrial Park reflecting the concentration of

industrial development in this growth centre. The provision of basic social overhead capital and industrial infrastructure has amounted to $4,220,292 to date.[13] This investment is expected to provide sufficient capacity to accommodate forecasted growth linked to DREE activity until 1975-76. A major project representing an integral part of the development of the Slave Lake/Mitsue Industrial Park growth centre is the Northern Industrial Road between Slave Lake and Fort Vermilion, involving capital costs of $3,002,402 to date, which will provide access to forest and petroleum resources in the hinterland.

3. Social Programming: Social programming activity has been directed primarily towards native peoples in the hinterland of the Special Area. The programs include basic industrial training, councelling, advisory and information services and mobility grants. This type of programming is designed to assist individuals and their families who lack experience in an urban/industrial society to take advantage of job opportunities opening up in the region and to adjust to unfamiliar patterns of work and a different life style.

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[13] Alberta Office of Program Coordination /107.

TABLE II

Industry Induced Under the DREE Incentives Program

Firm*	Type of Activity	Location	Capital Investment ($)	Incentives Grant ($)
North American Stud. Co.	Studmill	Mitsue Industrial Park	2,900,000	1,200,000
Vanderwell Contractors	Sawmill/ Planer Mill	Mitsue Industrial Park	132,241	83,448
Zeidler Plywood Co.	Veneer/ Stud and Chip Plant	Mitsue Industrial Park	2,506,932	853,330
Arcom Systems Ltd.	Modular Housing Plant	Mitsue Industrial Park	808,315	545,663
Alberta Aspen Board	Wafer Board Plant	Mitsue Industrial Park	5,834,000	2,043,500
Northwood Industries	Modular Housing Plant	Slave Lake	107,725	61,158
Northwest Fishing Coop.	Fish Processing Plant	Faust	88,187	53,228
Vanderwell Contractors	Sawmill	Red Earth	76,088	72,218
Swan Valley Sawmills	Sawmill	Swan Hills	324,000	97,400
			13,679,738	5,358,008

*Proctor and Gamble Pulpmill located near Grande Prairie is not included.

Source: DREE, 1973.

CHAPTER II

MULTIPLIER IMPACT MODELS: A THEORETICAL DISCUSSION

There appears to be growing awareness that regional development programs and other major developmental projects, for example the Athabasca Tar Sands and the Mackenzie Valley Pipeline projects, generate significant indirect impacts which are not usually encompassed by explicit goal areas.[1] Indirect benefits are important however, since these may fundamentally influence the choice of project, the nature of repayment by beneficiaries and the price of the primary goods and services generated by the project[2] and may be integral to the realization of program goals. This has resulted in an increased interest in multiplier analysis for predictive and evaluative impact modelling.

This chapter falls into three parts:

1. a discussion of the background to the multiplier model,
2. a critique of multiplier techniques as operational impact models, and
3. an examination of the role of the multiplier mechanism in the growth process.

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[1] Goal areas represent broad areas of policy concern, for example the impact of a program on the welfare of individuals and their families. Specific goals will be defined within goal areas.

[2] T. O'Riordan [41], pp. 26-27.

Background to the Multiplier Model

The multiplier model is an important aspect of Keynesian macro-economic theory, which relates to short run national stabilization policy. In the strict Keynesian sense the term 'multiplier' refers to the ratio of a change in income to the permanent change in the flow of expenditure that brought it about.[3] Since regional development is a long run process it might be argued that the multiplier, which is a short run model, is inappropriate for evaluating the impact of regional development programs. However, it is precisely the short run effects of developmental projects which are fed into the planning process to assist decision makers concerned with programming to keep the program on course.

The model is often used more loosely in its regional application to include the relationship between any initial expansion and its secondary effects. The assumptions of the multiplier model which might limit its usefulness include:[4]

1. the presence of unused resources to enable real output to expand;
2. an elastic supply of funds;
3. independence of savings and investment decisions;
4. a constant marginal propensity to consume;
5. neutrality of expectations.

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[3] R.G. Lipsey, G.R. Sparks and P.O. Steiner [39], p. 482.

[4] H.W. Richardson [43], p. 33.

The model is strictly limited in its application to incremental growth within a fixed output capacity and is not applicable to secondary expansion resulting in structural change.

The importance of the multiplier concept in regional development was recognized in an early study conducted by Barfod to investigate the local impact on income of a large scale petroleum project.[5] The method employed by Barford to derive the multiplier involved establishing static income relationships in the local economy. It was shown that 'primary elementary income' derived by the region from the factory in the form of local payments for labour and other inputs was less than total local payments due to leakages from the local economy. However, it was argued that 'primary investment or expenditure' generated a chain of secondary impacts since part of this would be spent locally, thus providing additional income. It was calculated that total income derived locally from total local payments by the factory was 27 per cent greater than the original sum paid. A different approach was adopted in another early study by Daly which dealt with employment growth during the inter-war period in England.[6] This study attempted to predict the effects of a change in employment in 'unimpeded' (export oriented) industries on employment in 'localized' industries;

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[5] B. Barfod [16]. See the summary discussion of Barfod's work in D.E. Keeble [38], p. 276.

[6] M.C. Daly [24].

those serving purely local needs. Computation of the multiplier involved defining the two types of activity and measuring their relative growth rates over a given time period. Daly's approach formed the basis for a number of subsequent multiplier studies because of its predictive possibilities.[7] However, it will be argued in the following section that a multiplier derived from an export/service ratio has limited usefulness for predictive purposes.

Alternative approaches to multiplier analysis involve the use of input-output models and Keynesian models. From a theoretical point of view these methods are more satisfactory than the export base approach but have heavier data requirements, hence the continuing popularity of base analysis.

Critique of Multiplier Techniques

a. Export Base Multipliers:[8] Early attempts to estimate regional multipliers usually relied on the export base approach. Export base theory assumes that exports are the sole autonomous items of expenditures; all other components of expenditure are treated as linear functions of income. The model reduces the economic system under consideration to a single region and the rest of the world. Thus for a given region income is simply a multiple of exports and the economic base multiplier is the

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[7] D.E. Keeble [38], p. 277.

[8] Basic references include R.B. Andrews [13]; J.W. Alexander [11]; M.C. Daly [24]; G.H. Hildebrand and A. Mace, Jr. [35]; W. Isard et al [37], pp. 189-205; and C.M. Tiebout [48, 49].

reciprocal of the export/income ratio. The derivation of the multiplier is given as follows:[9]

The export base income model may be stated as

1. $Y = E - M + X$

2. $E = eY$

3. $M = mY$

4. $X = \bar{X}$

where Y = net regional income, E = expenditure, M = imports, $\bar{X}$ = exports (autonomous), m = marginal propensity to import, e = marginal propensity to spend.

Substituting 2, 3 and 4 into 1

5. $Y = eY - mY + \bar{X}$

Therefore

6. $$Y = \frac{\bar{X}}{1 - e + m}$$

or

7. $$\frac{Y}{\bar{X}} = \frac{1}{1 - e + m}$$

Expression 7 is the multiplier.

The assumptions of the model determine that the average multiplier and the marginal multiplier are identical. That is

8. $$\frac{Y}{\bar{X}} = \frac{\Delta Y}{\Delta \bar{X}}$$

The symbol Δ indicates a change in the quantities denoted. It is clear however that if there are any items of autonomous

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[9] H.W. Richardson [43], pp. 19-20.

expenditure other than exports[10] or significant leakages through savings and taxes then

$$\frac{Y}{X} \neq \frac{\Delta Y}{\Delta X}$$

and thus the multiplier is distorted. The export base approach to multiplier analysis has been subjected to a plethora of theoretical criticism.[11] The major criticisms are summarized below:

1. the impact of export base expansion on total income will vary according to the sector in which base expansion occurs since there may be significant differences in the spending patterns of employees in different export sectors and in the complexity of local inter-industry linkages, and thus the multiplier is too aggregative.[12]

2. increasing geographical specialization and inter-dependence result in changes in the export/service ratio over time and therefore the predictive value of the multiplier is limited.

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[10] A case could be made for treating the public sector as an export sector which to some extent circumvents this problem.

[11] See especially H.W. Richardson [45], pp. 16-22.

[12] This suggests that the reliability of the multiplier will be increased if the export base is disaggregated, see S.G. Weiss and E.C. Gooding [51]. However, the technique employed by Weiss and Gooding does not trace differential interdependencies between the various sectors and is thus not very useful [43], pp. 32-33.

3. changes in the volume of service activity are lagged in response to export base expansion and therefore the export/service ratio is distorted.

4. exports provide an insufficient basis for forecasting changes in regional economic activity.

Strictly speaking export base analysis is concerned with identifying export income but the paucity of regional income data has necessitated the use of proxy indicators, particularly employment. However, there are a number of reasons why employment can be considered a poor indicator of change in export activity:

1. regional income will rise immediately in response to base expansion but employment will only increase in the long run,

2. differential effects of base expansion on income vary according to the relative wage levels in the industries involved and the long run effects of productivity increases are not taken account of in measures of employment,

3. a certain percentage of a region's income may be unearned and the effects of this on the export/service ratio will not be reflected in employment figures.

Although the above arguments are valid it should be noted that in certain cases an employment multiplier might be considered more relevant than an income multiplier, for example in an investigation of the impact of an employment creation program.

From a theoretical point of view the export base approach to multiplier analysis has serious weaknesses. In addition there are operational difficulties, particularly the problem of separating the export and service sectors of the economy. Nevertheless from an operational viewpoint the model, given data availability and time and cost considerations, it is a useful tool for impact analysis.

b. Input-output Multipliers:[13] The input-out approach to multiplier analysis is particularly relevant when the impact of linkage effects is a major policy concern. The technique is discussed briefly below.

If total regional production is disaggregated by sector a matrix, termed an input-output matrix, is obtained from which the flows of payments for goods and services between sectors can be traced. In order to calculate the secondary effects of expansion in any particular sector of the economy the value of the first round of inputs from all other sectors needed to achieve this initial expansion is derived from the matrix of input coefficients. After allowing for exogenous inputs the second round of input demands generated by this first round of output expansion are calculated. This process is iterated until the increase represented by the 'nth' round is negligible. Summing the totals for each round gives the secondary effects of the initial expansion. The particular advantage of this approach is that it stresses interdependence in the economy and can be

[13] The standard reference is W. Isard et al [37], pp. 309-374.

employed to trace the differential impact of any given expansion. However, a number of technical and theoretical problems associated with the input-output approach detract from its usefulness:

1. the paucity, or more often complete absence of relevant data in either published or unpublished form at the regional level;

2. the enormous time and money costs involved in obtaining the necessary data through survey methods;

3. the cross sectional, that is, static nature of the model;

4. the restrictive assumptions of the model, which include constant linear input functions, no multi-product industries and no external economies.[14]

c. Keynesian Multipliers: In the context of regional development theory in Britain, attention has focussed on the Keynesian multiplier as opposed to the heavy concern with export base and input-output models in North America.[15] The Keynesian multiplier is derived from an income relationship of the form

1. $Y = C + I + G + X - M$

where Y = income, C = consumption, I = investment, G = government

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[14] In the case of large scale projects such as the Mackenzie Valley Pipeline, production functions of firms are likely to be altered and large external economies generated.

[15] For example, G.C. Archibald [14]; A.J. Brown et al [20] [52]; M. Brownrigg [21]; M.A. Greig [30, 31]; and T. Wilson [52].

spending, X = exports, M = imports. Assume that consumption and imports are linear functions of income, G, I and X are autonomous and all taxes fall on income. That is

$$2.\quad C = a + cY^d$$

where Y^d = disposable income and c = the marginal propensity to consume.

$$3.\quad I = \bar{I} \text{ (autonomous)}$$

$$4.\quad G = \bar{G} \text{ (autonomous)}$$

$$5.\quad X = \bar{X} \text{ (autonomous)}$$

$$6.\quad M = b + mY^d$$

where m the marginal propensity to import.

$$7.\quad Y^d = Y - T$$

where T taxes.

$$8.\quad T = tY$$

where t = the marginal tax rate.

Substituting 2 to 8 into 1 and rearranging gives the income equation

$$9.\quad Y = \frac{\bar{I} + \bar{G} + \bar{X}}{1 - (c - m)(1 - t)}$$

Therefore the multiplier k is given by

$$10.\quad k = \frac{1}{1 - (c - m)(1 - t)}$$

Estimating the coefficients for this type of model is difficult since the requisite data at the regional level are generally lacking, necessitating the use of indirect estimation procedures. It is possible to derive an estimate of the marginal propensity to import (m), the most difficult coefficient to

estimate, by calculating the 'propensity to add value locally' from national expenditure data.[16] Archibald put the average minimum value of the regional multiplier at 1.25.[17] Brown estimated an average value of 1.28 for the Development Areas, designated regions for regional policy, compared with a national multiplier of 1.46.[18] Greig's study of the local impact of a pulp and paper mill located in Scotland put the income multiplier in the range 1.44 - 1.54.[19] This represents a high value for a small remote region and results from the use of average rather than marginal coefficients in estimating the first round impact, which was justified on theoretical grounds.

Certain modifications to the basic Keynesian model have been suggested in various studies to take account of repercussions from inter-regional trade,[20] injection leakages[21] and induced investment.[22]

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16 G.C. Archibald [14].

17 G.C. Archibald [14].

18 A.J. Brown et al [20].

19 M.A. Greig [30].

20 A.J. Brown et al [20].

21 T. Wilson [32].

22 G.C. Archibald [14]; M. Brownrigg [21]; and T. Wilson [32].

The first modification is not considered significant in terms of the inter-regional impact of a typical developmental program, although it might be significant with respect to large scale projects, since it is unlikely that this would raise income and thus import demand sufficiently in other regions to have an important feed-back effect on the target region through stimulation of its export sector. The case of injection leakages is however more significant since a high import leakage in the original injection could reduce the overall expansion in income to below the original expenditure on investment which brought it about. That is the multiplier could fall below unity. This situation is highly likely in a backward region selected for a developmental program which includes infrastructure projects since its capital goods industry will be weakly developed or non-existent and thus the only part of the injection involved in the multiplier process will be the payment of wages and salaries to construction workers.

The possibility that secondary induced investment will result from an initial injection also has to be considered. Provided that this injection is sustained and there is no excess capacity in the capital goods industry of a given region, secondary investment will be sustained by a multiplier of $k(1 - M_K)$ where M_K = the import content of investment.[23] Archibald and Wilson argue that the effects on regional income of induced investment

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[23] H.W. Richardson [43], p. 35.

resulting from in-migration are more significant than the multiplier effects of the additional wage earners' expenditures.[24] Brownrigg concluded that a constant boost from induced investment will only result if a steady stream of new projects accompanied at each stage by in-migration characterizes development. Such a pattern of development would periodically place pressure on existing capacity and thus continue the feedback from induced investment.[25]

In addition to the basic restrictive assumptions of the model noted previously, there are three additional weaknesses which should be considered:

1. the model does not take account of lags in the circular flow of income;

2. excess capacity considerations are ignored;

3. the model is basically a consumer demand based model and thus neglects inter-industry demand.

There appears to be a good deal of confusion concerning the theoretical relationship between the export base multiplier and the Keynesian multiplier. It has been argued that the export base multiplier is not related to the Keynesian multiplier at all.[26] This observation is short-sighted since

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24 G.C. Archibald [14]; and T. Wilson [32].

25 M. Brownrigg [21].

26 G.C. Archibald [14]; and T. Wilson [32].

the export-base model is clearly derived from Keynesian national income theory, applied to the case of an open economy, with the modification that exports are treated as the sole autonomous factor determining aggregate demand.[27]

d. Incidence Multipliers: There is increasing concern in regional policy with the articulation of program goals relating to the delivery of benefits to specific target groups. Traditional multiplier models are inadequate for handling these types of considerations in impact analysis. Haverman and Krutilla have applied input-output type analysis to identify the incidence of benefits from regional development programs to the unemployed.[28] However, it is considered that this technique is too clumsy and excessively costly for general applications.

An interesting model derived from the Keynesian model discussed above formulated in matrix terms has been developed to evaluate the incidence of income impacts to different income groups from the Economic Development Administrations Business Loan Program in the U.S.A.[29] Briefly, the model traces earnings interdependencies between different income groups using a markov chain approach and provides a means for estimating the

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[27] H.W. Richardson [44], p. 336.

[28] R. Haverman and J.R. Krutilla [34].

[29] A.L. Silvers [46].

incidence of program benefits to different income groups resulting from the injection of income into a regional economy. In contrast to the simple Keynesian and export base models, the incidence multiplier developed by Silvers is a quasi dynamic model; that is, 'time labels' are given to components of the income equation. However, the model is not truly dynamic since a stationary type Markov process is used to simulate the multiplier effect.

The results of the evaluation of the EDA program suggest a number of important policy implications:

1. the size of the aggregate multiplier increases as the incidence of direct benefits is proportionately biased towards the poor;

2. the total direct and indirect benefits incident to the poor are highly sensitive to the proportion of direct benefits incident to that group;

3. the total indirect benefits incident to each income group are independent of the distribution of direct benefits and therefore the multiplier will not cause a shift in the distribution of income since the structure of income circulation maintains the existing pattern of income distribution.

The model embodies the weaknesses of the Keynesian model discussed above, for example inter-industry demand is ignored and no lags are assumed. Specific weaknesses of the model include:

1. the failure to take account of the fact that a given

individual may receive his/her earnings in a particular income category but participate in the spending of a household classified in a higher income category;

2. the assumption that the structure of income distribution is not changed through an employment multiplier linked to the income multiplier.

A more formal discussion of the model will be presented in Chapter III where it will be applied to the Lesser Slave Lake Program.

The Multiplier Mechanism in the Growth Process

a. The multiplier and cumulative growth: A major regional development program will instigate a complex set of growth impulses which are generated through multiplier effects stimulating a circular and cumulative process of growth (Figure 4). The process may be stimulated initially by the entry of firms induced to locate in a lagging region through incentives. This activity will generate local demands for production inputs and for goods and services associated with increases aggregate household demand. New firms supplying inputs to the directly induced firms may locate in the region or existing firms may expand their output. Linked firms which use the outputs of the directly induced firms may also be induced to locate in the region. Induced demand for public goods and services will begin to bump up against existing capacity, assuming that no slack exists, necessitating an

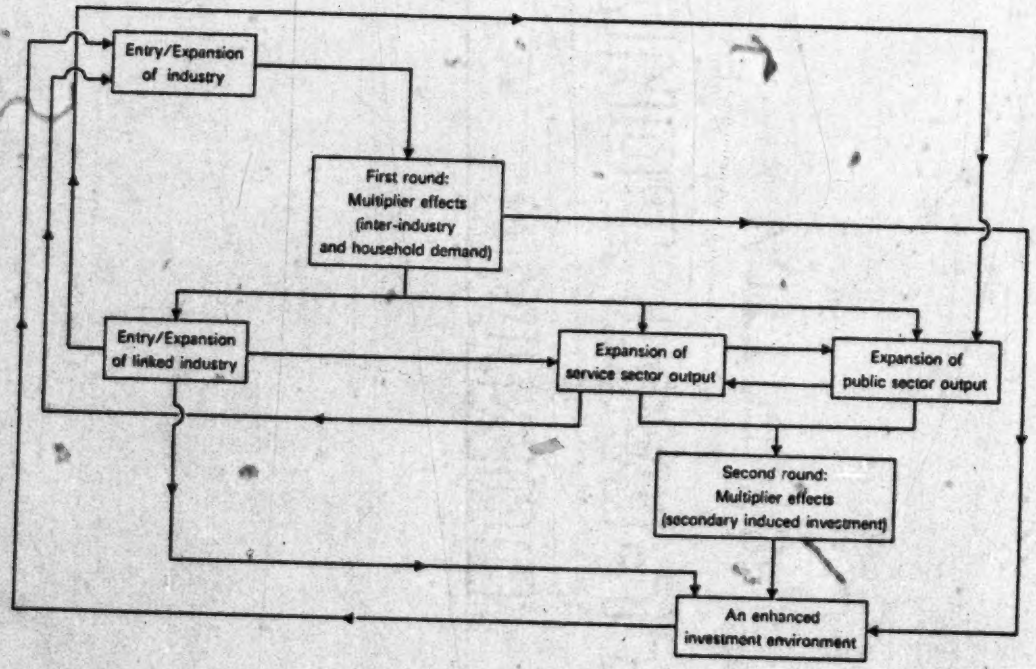
Entry/Expansion of industry
First round: Multiplier effects (inter-industry and household demand)
Entry/Expansion of linked industry
Expansion of service sector output
Expansion of public sector output
Second round: Multiplier effects (secondary induced investment)
An enhanced investment environment

Figure 4
THE MULTIPLIER MECHANISM IN THE GROWTH PROCESS

expansion in public sector output. This set of impacts will continue until some equilibrium stage is reached. The degree to which growth is cumulative and self-sustaining will depend fundamentally upon the type of industrial structure induced, the size of the centres in which developmental efforts are concentrated and the extent to which leakages dampen local multiplier effects.

b. Spatial aspects of growth and the multiplier: The body of theory dealing with the spatial incidence and transmission of economic growth is highly generalized and largely untested. The classic statements of this theory are those by Myrdal[30] and Hirschman.[31] Both start from the premise that economic development becomes spatially concentrated in certain areas which gain some initial advantage at an early stage in the development process. These areas continue to grow largely as a result of agglomeration economies which develop in the rapidly expanding centres of the core. Development in the core stimulates some growth in the periphery, mainly through inter-regional trade, 'trickling down effects' in Hirschman's terminology or 'spread effects', to use Myrdal's rendering of the same notion.

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[30] G.M. Myrdal [40].

[31] A.O. Hirschman [36].

However, unfavourable 'polarization effects', or 'backwash effects', may occur in the periphery as the centres in the core become increasingly dominant and attract the lagging region's capital and most productive labour because of the greater renumeration to factors offered there. This argument conflicts with the Neoclassical view that returns to factors tend to become equalized between regions through inter-regional flows of labour and capital.[32] Neoclassical theory, however, takes no account of agglomeration economies, which would appear to be a serious shortcoming in any discussion of regional economic growth. Industry in the peripheral area may also suffer from competition of that in the core and experience a heavy influx of relatively high-value goods, resulting in an adverse balance of payments situation which further supresses development.

Hirschman argues that in the long-run convergence will occur as a result of increasing diseconomies in the core, causing development to spread into the periphery. Neoclassical theory also predicts convergence, but the process through which this occurs is very different from that in Hirschman's theory. Myrdal on the other hand maintains that long run divergence results under free market conditions, caused by the 'circular and cumulative nature of the growth process'. It is argued further that a balance between polarization and spread effects

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[32] See G.H. Borts [17]; and G.H. Borts and J.L. Stein [18].

resulting from the free play of market forces indicates general stagnation, which represents an unfavourable case of convergence.

In any consideration of the impact of regional development it would clearly be useful to have some knowledge concerning the spatial incidence of multiplier effects, since this would throw some light on the relative magnitudes of spread and polarization effects which fundamentally influence the growth process. Unfortunately, multiplier models at their present stage of development abstract from differences within regions, which are assumed to be homogeneous and, ultimately, spaceless. This represents a serious short-coming since a regional hierarchy of central places implies an associated hierarchy of cash flows and a corresponding incidence of multiplier effects.

In general, the multiplier impact in any given centre will be determined by the marginal propensity to spend locally. The demand for low order goods, which are supplied by small centres, is income inelastic and therefore there will be a tendency for any additional income to be spent on higher order goods, which are supplied by larger centres. Thus in low order places the marginal propensity to consume locally is usually small, therefore, the multiplier will also be small and there will be a tendency for income to become concentrated in higher order centres. These theoretical arguments suggest two important policy implications:

1. higher order centers, rather than low order centres should be developed in order to reduce income leakages from

regions which show a high propensity to import and thus tend to suffer from balance of payments problems;

2. the spread effects from a small growth centre will tend to be offset by polarization effects, with respect to diffusion of income into the hinterland.

With the above implications in mind it is appropriate at this point to examine some issues regarding the role of the growth centre approach in regional development policy. The notion of a growth centre strategy, whereby investment is concentrated in a limited number of centres to generate development over a wider area undoubtedly has much intuitive appeal, although as Darwent has noted the concept rests on a number of loosely formulated theoretical arguments which have not been verified empirically.[33] From a normative point of view the 'growth-centre' concept is not closely related to Perroux's 'growth-pole' theory[34] which deals with inter-industry linkages in abstract economic space and the two ideas should not be confused. The basic issue surrounding the spatial allocations of investment may be summarized as a choice between emphasizing growth at the expense of welfare and concentrating investment in larger centres, thus generating larger multiplier and spread effects, rather than scattering

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[33] D.F. Darwent [25], p. 13.

[34] F. Perroux [42].

investment around in a 'vague search for equity'.[35]

The rationale of a growth centre policy is generally based on the following arguments:[36]

1. the spatial concentration of investment is more efficient than a dispersal of funds;

2. in the long-run overall regional growth will be maximized by concentrating development and thus generating large internal multipliers in the growth centre which will transmit growth into the hinterland;

3. for a given level of subsidy, a growth centre strategy will attract more capital from external sources than a dispersed growth policy.

These arguments suggest that growth and efficiency are maximized through spatial concentration but completely neglect equity considerations. Furthermore the arguments cited in favour of such a policy lack substantial verification.

In the context of this study the question which is of particular relevance with reference to the present discussion concerns the viability of basing a growth centre policy on low order centres, say places with a population of less than 10,000, a figure well below that traditionally regarded as a minimum for a viable growth centre. In terms of efficiency such a policy would be difficult to justify for several reasons:

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[35] D.F. Darwent [25], p. 13.

[36] G.C. Cameron [22], p. 19.

1. low order centres frequently lack the basic package of public goods and services required to attract industry and support growing populations. Generally, such centres have insufficient fiscal capacity to provide this package and therefore external sources of financing are necessary. Two main possibilities exist:

a. heavy subsidization of public works and services, implying an inefficient use of public funds,

b. heavy debt financing at the municipal level,

neither of which is very satisfactory.

In contrast, higher order centres have the basic items of public infrastructure and service package, and increments to this stock can be made at low cost as existing capacity becomes fully utilized. An incrementalist approach to providing the public package of goods is considered excessively costly with respect to small, rapidly growing centres, and therefore it is necessary to create substantial excess capacity. This approach is obviously risky since growth might not reach expected levels, thus resulting in diseconomies of under utilization.

2. Small, rapidly developing centres will generally exhibit high import leakages, thus accelerating the tendency for income to flow up the settlement hierarchy and dampening local multiplier effects. Furthermore, there is little scope for generating significant spread affects at such a low level in the hierarchy since any additional income received in the

lowest order places will tend to flow upward through the hierarchy and may bepass the local growth centre in doing so.

3. The ability of a place to attract additional capital, and therefore industry, which means jobs, is considered to be fundamentally a function of its size, or more explicitly, the extent to which agglomeration economies are developed. No reliable measure of agglomeration economies exists and therefore it is uncertain at what scale these become significant, but it would seem reasonable to assume that small centres do not generate these attractive forces. Therefore, theoretically, the level of subsidy required to attract additional capital to small centres will be much greater than that required in the case of larger centres.

However, in evaluating this policy it is important to take account of two important equity considerations:

1. the lack of basic public infrastructure and services in many small centres is a good justification, on equity grounds, for providing this package in such places, even if this is relatively costly.

2. the benefits of urbanization, for example public services and jobs, may filter down from the growth centre to residents in the hinterland, given conditions of general accessibility within the region. However, such 'externalities' may not be significant if the region in question is not strongly linked internally in a functional sense. In this situation accelerated intra-regional migration to the growth

centre from its hinterland is likely, perhaps causing serious bottlenecks with respect to housing, schools, health facilities, etc.

This migration process might be considered favourable and encouraged through appropriate programs, for example mobility grants. A less favourable situation is likely to occur, however, if the hinterland population is immobile and, or isolated from the growth centre, in which case severe intra-regional disparities could result.

The implications for policy of the preceeding discussion are clear. There is little justification for assuming that a growth centre approach to regional development, at any scale, is necessarily the most effective. Thus, it is reasonable to suggest that alternative policies would be equally valid, for example 'finely tuned' fiscal equalization programs applied at the regional level. The inescapable conclusion is that very little is known about the effectiveness of alternative types of developmental programs.

CHAPTER III

MULTIPLIER IMPACT ANALYSIS OF THE PROGRAM

The multiplier analysis of program impacts comprises two parts. The first involves measuring the employment multiplier and indicating the incidence of direct and indirect benefits to different groups in the region and the spatial effects of employment creation. The second part attempts to simulate the distributional effects of the income multiplier from the directly induced DREE payroll.

The Models

A general static model was used to determine the employment multiplier effects of the program based on the technique used by Yeates and Lloyd to estimate secondary employment creation resulting from the ADA program.[1] The overall impact of the program on employment is defined as:

$$E = E_D + E_P + E_L + E_I$$

Where E = total direct and indirect employment induced by the program.

E_D = employment created directly under the DREE industrial incentives scheme.

E_P = employment created in the public sector as a direct result of the program.

E_L = employment created in industrial and service firms linked directly to DREE assisted firms.

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[1] M.H. Yeates and P.E. Lloyd [53], pp. 3-4.

E_I = employment created indirectly as a result of consumer spending out of the directly induced DREE payroll and increased demand for public services.

Indirectly induced employment was estimated using a basic-nonbasic procedure. The impact of construction activity related to program funded infrastructure projects was not included in the model since this activity is not associated with a permanent increase in income and employment and thus has only very short-run significance. This impact will be commented on briefly. The 'incidence' groups to be considered include (a) native peoples, (b) the 'hard-core' unemployed, that is employables on welfare, and (c) long-term residents of the region. The analysis of the spatial impact of the program includes an investigation of (a) the spread of benefits into the hinterland and (b) in-migration from outside of the program region. This analysis will indicate the degree to which the program is integrating the local underprivileged population.

The second model employed in the analysis treats the multiplier process associated with consumer spending as a stationary markov chain and deals with the differential multiplier impact of the program to various income groups.[2]

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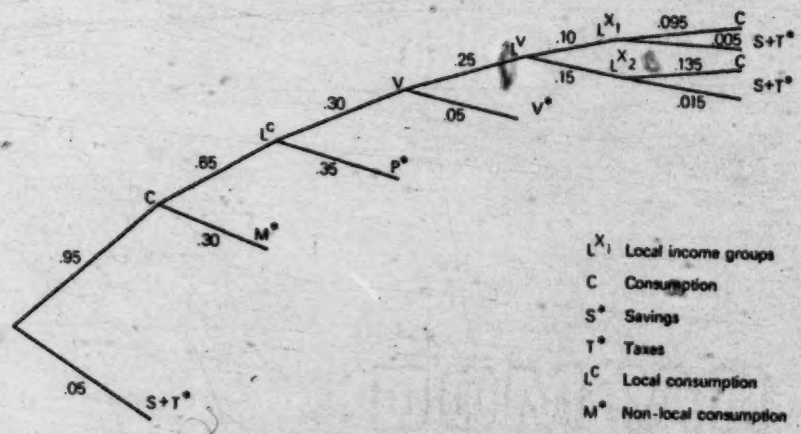
[2] The model is discussed fully in A.L. Silver [46], pp. 175-180.



L^{X_i} Local income groups
C Consumption
S^* Savings
T^* Taxes
L^C Local consumption
M^* Non-local consumption
V Value added
P^* Industry purchases
L^V Local value added
V^* Non-local value added

An asterisk * indicates an absorbing state. It is assumed that a dollar entering one of these states will not re-enter the local income stream.

Figure 5
A MARKOV CHAIN PROCESS SHOWING THE POSSIBLE PATHS OF A DOLLAR EARNED ORIGINALLY BY INCOME GROUP X_1
Iterating this process to the 'nth' round generates the multiplier

The income relationship from which the 'incidence' multipliers are derived is expressed as

$$Y_i(t) = \sum_j C_{ij}(t) + \bar{X}(t)$$

That is, the income of the ith income group in time period t simply equals the sum of income generated by local consumer spending and export income which is regarded as autonomous. It is assumed that the income earned directly by the ith income group in time period t from consumer spending by the jth income group is a constant proportion, p_{ij}, of the jth group's income, Y_j, in time period t - 1. That is

$$C_{ij}(t) = p_{ij}\, Y_j(t - 1)$$

An elementary markov chain model of the multiplier process is illustrated in Figure 5.[3] The model may be formalized as follows. The propensity for income group i to consume commodity k, which is assumed to be a constant proportion of income, is

1. $c_{ik} = C_{ik}/Y_i$

The propensity for income group i to consume commodity k non-locally is

2. $m_{ik} = M_{ik}/C_{ik}$

Therefore, the propensity for income group i to consume commodity k locally is

3. $^{L}c_{ik} = c_{ik}(1 - m_{ik})$

The distribution of earnings amongst income groups in commodity

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[3] For an elementary discussion of markov chains see D. Harvey [33], pp. 577 - 582.

sector k is represented by

$$4.\quad a_{kj} = Y_{kj}/Y_k$$

Adjusting the a_{kj} coefficients so as to include only local value added, ${}_LV_k$,

$$5.\quad {}_La_{kj} = a_{ik}\ {}_LV_k$$

Thus, the probability that a dollar spent by income group i is earned locally by employees in the jth income group in commodity sector k is

$$6.\quad {}_Lp_{ij} = \sum_{k=1}^{n} {}_LC_{ik}\,{}_La_{kj}$$

Expressing 6. above in matrix terms

$$7.\quad {}_LP = {}_LC_LA$$

The matrix ${}_LP$ expresses the probability that a dollar spent by income group i is earned locally by income group j. The incidence of direct and indirect income to each income group is given as

$$8.\quad K = (I - {}_LP^T)^{-1}$$

Therefore the total direct and indirect increase in income, ΔY, resulting from a rise in export income, $\Delta\bar{X}$, induced in this case by the DREE program is simply

$$9.\quad \Delta Y = (I - {}_LP^T)^{-1}\Delta\bar{X}$$

Data Sources

Two basic sets of accounts were constructed from primary and secondary data sources to furnish the input for the models outlined above; (a) household expenditure accouts, and (b) input-output type accounts.

(a) Household expenditure accounts

The data required to construct a basic set of household accounts were obtained from the Statistics Canada family expenditure survey[4] and from a questionnaire administered to a sample of Slave Lake area residents (Appendix I). Formal sampling procedures were not employed since no suitable information base was found from which a sample could have been drawn. Thus, a more pragmatic approach was adopted. At the household level every fourth dwelling unit in Slave Lake was systematically sampled. A total of 104 of the 225 households contacted responded to the questionnaire, representing 46.22 per cent of the sample. In order to make the analysis meaningful it was necessary to ensure that a sufficiently large number of households directly affected by the program were included. Thus questionnaires were distributed to individuals employed in program related activities at their place of work. The recipients of this set of questionnaires, 69 public sector employees and 128 employees in the private sector, made 35 useable returns, giving a total of 139 questionnaires which could be worked with.

The questionnaire elicited the following information:

1. household size;
2. occupations of all household members employed full-time, part-time or seasonally;
3. places of work of the above;

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[4] Statistics Canada [47].

4. total disposable household income;
5. distribution of expenditures on goods and services disaggregated spatially and by commodity group.

During the initial stages of the survey it became evident that the time and money costs involved in constructing a detailed expenditure schedule for every household interviewed were unreasonably high, given a limited budget and the time constraint. Thus Statistics Canada data were used throughout to obtain the breakdown of household expenditures by commodity, differentiated by income group. The primary expenditure data derived from the survey therefore relate purely to the spatial breakdown of consumption in percentage terms. Naturally, the heavy assumptions involved in utilizing secondary data render a detailed analysis of expenditure patterns impossible.

b. Input-output type accounts

Basic input-output data were derived from questionnaires distributed to selected Slave Lake/Mitsue Lake firms (Appendix 2). The following information was requested of the firms contacted:

1. main productions and/or services (for designation purposes);
2. value of investment in plant, machinery and equipment, 1971-72/1972-73 fiscal years;
3. location of supplies of investment goods;
4. sources of funding for 2 above;

5. total payroll, 1972-73 fiscal year;
6. total value of inputs by origin and outputs by destination, disaggregated spatially and sectorally, 1972-73 fiscal year.

Full coverage of the six DREE assisted firms located in the study area was undertaken. At the time of survey, however, three firms were non-operational and thus unable to complete the questionnaire. Informal interviews were conducted with managers of two of these firms to establish the expected payroll. The full cooperation of the three operational firms was received.

It was quickly established that the only significant local interindustry linkage produced by the DREE assisted wood products firms located at Mitsue Industrial Park was an input (demand) relationship with the logging sector. Three logging firms 'inputting' to the DREE induced enterprises were earmarked for interviewing. However, successful contact was made with only one firm.

The poorest response to the questionnaire came from the local service sector and the oil well service sector. Approximately one third of the firms in each sector were contacted. Only four fully completed returns were made in each case. A number of partially completed questionnaires were obtained; twenty four from the service sector and four from the oil well service sector. However, the amount of useful information which could be derived from these returns was minimal. The

main reasons for non-response appeared to be the perceived time cost of completing questionnaire and the perceived intrusion of privacy. The first objection would not seem to hold much water since the questionnaire was appraised by an accountant who estimated that it could be completed in fifteen to thirty minutes, which can be hardly considered excessive. The second objection is clearly a matter of individual opinion and the researcher can only hope to persuade the potential interviewer that the project being undertaken is worthwhile and offer a quarantee of confidentiality. In the case of the oil and gas well service sector a number of the firms contacted were subsiduaries of multi-national organizations and the individual operators did not apparently have the authority to release information of the type requested. A further difficulty encountered was that firms in the area had been over-studied. This problem stemmed from the poor coordination of research undertaken by government which inevitably resulted in duplication of data collection; a factor which undoubtedly contributed to the poor response rate.

An additional questionnaire (Appendix 3) was administered to 35 retail and service firms in the community representing a cross-section of this sector to determine the distribution of earnings, that is income from sales, amongst different income groups. Twenty two fully completed questionnaires were obtained from the interview survey conducted. The high rate of response to this questionnaire, compared to the low

response rate to the first questionnaire, is obviously related to its brevity rather than to the nature of the questions asked.

The Employment Multiplier

The model outlined at the beginning of this chapter defined the program employment multiplier as the sum of directly induced employment comprising (a) employment created under the DREE industrial incentives program and (b) public sector employment related to program activities, employment linked directly to ~~(a)~~ and (b) above, and indirectly induced employment resulting from consumer spending out of the directly induced payroll and additional demand for public goods and services.

1. Directly Induced Employment

a. Directly DREE Induced Employment

Employment creation under the DREE incentives scheme has largely been concentrated in the wood products sector based on firms located at Mitsue Industrial Park. This sector has been the prime mover behind recent growth in the Slave Lake regional economy. However job creation has lagged consistently behind schedule and employment in the DREE plants has fluctuated during the early stages of production. Nevertheless employment at present corresponds closely to projected employment at initial production capacity although certain

operational bottlenecks are still evident. On the basis of the most up to date information available 291 jobs in the wood product sector can be attributed directly to the DREE program. Of the above employment positions 57 are seasonal.[5] The directly DREE induced payroll of this sector, is estimated at $1,722,360 annually. Additional employment created to date under the DREE incentives program is linked to a native-backed motel/restaurant enterprise employing a total of 49 individuals, 11 of whom are part-time employees. The estimated payroll generated by this operation is $210,000 annually.[6] In summary the DREE program accounts at present for 340 direct jobs and for a directly induced annual payroll of $1,932,360. Assuming the firms established to date reach projected full production capacity on schedule, the directly DREE induced labour force will build up to 718 by September 1976.[7] This projection excludes logging employment.

b. Directly Induced Public Sector Employment

Program related public sector employment refers to those positions concerned essentially with social programming tasks. All the positions referred to are based at Slave Lake. From information supplied by the Office of Program Coordination it was determined that 24 permanent positions and 12 project

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[5] This total includes 41 jobs in a saw mill at Red Earth.

[6] Alberta Department of Advanced Education /1/.

[7] Alberta Department of Advanced Education /1/.

positions were created as a direct result of the program. The induced payroll associated with public sector activity is $269,883 annually.[8]

2. DREE Linked Employment

It has been previously noted that the only significant linkage effect induced by the DREE incentives program is a backward linkage from the DREE assisted wood products plants to the local logging sector. The spinoff thus far in terms of logging jobs is limited which could be a result of initial operational snags experienced by the plants and the internalization of logging operations. Contracted logging undertaken for the DREE assisted firms currently provides 79 seasonal logging jobs generating an annual payroll of $331,800. Several of the DREE firms undertake their own logging operations which account for 56 seasonal jobs and for an estimated payroll of $168,000 annually.[9] Expansion of directly DREE induced activity in the wood products sector is forcasted to create an additional 216 logging jobs by December 1976, assuming that the plants reach full production capacity on schedule.[10]

Total industry purchases made locally by the DREE assisted firms from the service sector amounted to $539,060 for the

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[8] Information supplied by OPC, August 1973.

[9] Information supplied by personal communication with manager of the firms involved.

[10] Alberta Department of Advanced Education [1].

1972-73 fiscal year. From a questionnaire survey of retail and service establishments in Slave Lake it was ascertained that on average 12 per cent of the value of gross sales was spent on wages and salaries and the average wage was $7,280.[11] Applying this proportion to the value of purchases made by DREE assisted firms and dividing by the average wage, 9 service jobs can be attributed to DREE industry.[12]

3. Indirectly Induced Employment

A number of conceptual and technical difficulties complicate the task of defining the indirect employment impact of the program on the local service sector and public sector activity not directly related to Special Area programming tasks. These problems will be summarized in the discussion of indirectly induced employment which follows below.

It is extremely difficult at this time to estimate indirectly induced service employment as a result of uncertainties regarding entrepreneurial reaction to DREE activity in the special area. The multiplier model assumes that indirectly induced expansion is synchronized perfectly with directly induced expansion which is clearly unrealistic since the expectations of entrepreneurs are unlikely to be neutral. Anticipation of expected directly

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[11] Questionnaire Survey, January, 1974.

[12] Purchases by the program induced public sector from the local service sector for the 1972-73 fiscal year, which amounted to $18,265, had a negligible impact on service sector employment.

induced expansion may create temporary excess capacity in the nonbasic sector of the local economy. Conversely, expansion in the nonbasic sector may be sluggish if entrepreneurial reaction is cautious. Lags may also occur with respect to nonbasic expansion as a result of bottlenecks in the supply of investments funds and labour, the existence of excess capacity or productivity increases. Therefore the multiplier is likely to be distorted in the short run since the DREE program acts initially as a disequilibrating mechanism.

The indirect impact of the program on public sector employment is difficult to establish since it is not clear how to handle this sector in terms of the basic nonbasic dichotomy. The problem arises from the way in which public goods and services are provided. Although public sector expansion tends to be responsive to base expansion induced in the private sector and thus could be regarded as nonbasic, funding of expansion induced indirectly in the public sector is external to the region which constitutes a source of basic income. Furthermore the public sector may be expanded independently of expansion in the private sector. The definitional ambiquity does not end here. Local government performs purely local services and could therefore be considered exclusively nonbasic. However local government is not supported by purely locally derived revenue and therefore should have a basic component. The non-local government public sector on the other hand performs services for the community in which

it is based, that is nonbasic activity, and for the hinterland, that is basic activity. On the basis of this argument an exclusive 'basic' label would seem inappropriate. The non-local government public sector however, is funded entirely by external sources of revenue and should therefore be classified as basic. This problem which stems from the weakness of the basic--nonbasic concept has no obvious solution. The significance of this definitional problem is obvious since the size of the multiplier will depend on how the public sector is handled. In order to circumvent this difficulty an attempt was made to establish the indirect impact of the program using classifications based on sources of funding and orientation of service employment to local (nonbasic) and external (basic) needs. The multipliers thus obtained are presented below.

Technique A. (Funding)

The total basic payroll comprises income from directly DREE induced employment, DREE linked employment and public sector employment. The basic component of the local government sector was considered to be represented by the proportion of current revenue derived from non-local sources.[13] The nonbasic payroll consists of the nonbasic component of the retail service

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[13] This does not include capital revenue because of transfers of funds received on capital account by Slave Lake to other accounts which could not be traced from the Financial Statement of the town.

sector, that is the proportion of total income for this sector supported by town based activities,[14] and the nonbasic portion of local government, which is assumed to be proportional to locally derived funding. Table III summarizes employment and income by sector disaggregated into basic and nonbasic components. Summing the column totals for income gives a basic payroll of $9,678,913 and a nonbasic payroll of $1,887,291. Performing the procedure for employment gives a total of 1083 basic jobs and 257 nonbasic jobs. The multiplier is defined as the sum of basic and nonbasic income or employment divided by basic income or employment. Thus the community income multiplier is simply

$$\frac{9,678,913 + 1,887,291}{9,678,913} = 1.195$$

and the community employment multipler is

$$\frac{1083 + 257}{1083} = 1.237$$

The DREE multipler was derived as follows. Directly DREE induced employment and linked DREE employment accounts for 24.53 per cent of the total basic payroll. Therefore if it is assumed that DREE activity supports an equivalent proportion of the nonbasic payroll, and thus nonbasic employment, the DREE multiplier is simply the sum of DREE employment (324) and nonbasic jobs (63) supported by the DREE payroll divided by the number of DREE jobs.

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[14] Alberta Department of Municipal Affairs [7].

TABLE III

Technique A. Basic and Nonbasic

Sector Employment and Income, 1973/74

Sector	Employment Full Time Equivalent Jobs		Annual Payroll	
	Basic	Nonbasic	Basic	Nonbasic
Wood Products	272	-	2,099,160	-
i DREE Plants	238	-	1,599,360	-
ii DREE Logging	14	-	168,000	-
iii Contracted Logging	20	-	331,800	-
Public Sector	232	16	1,950,664	176,498
i Public Health, Welfare & Education	110	-	935,333	-
ii Non-local Government Administration	114*	-	930,000	-
iii Local Government	8	16	85,331	176,498
Oil Well Service Sector	357	-	4,146,912	-
Retail Service Sector	222	241	1,482,177	1,710,793
i Dree	43	-	210,000	-
ii Non-DREE	170	241	1,206,657	1,710,793
iii DREE Linked	9	-	65,520	-

* includes 36 jobs (directly induced DREE public sector)

Sources: See Table in Appendix 4.

That is $\frac{324 + 63}{324} = 1.194$

The DREE Public Sector multiplier was derived using the same procedure as above. This sector accounts for 36 jobs and for 28 per cent of the total basic payroll and thus supports 7 nonbasic jobs. The multiplier is therefore $\frac{36 + 7}{36} = 1.194$

The income multiplier associated with the DREE impact can be obtained by simply substituting figures for basic and nonbasic payroll into the expressions above. This produces income multipliers for the DREE private sector and public sector activities. This reveals that the income and employment multipliers are indentical which result from the procedure used. Obviously the same result occurs in the case of the technique employed below.

Technique B. (Service)

The total basic payroll in this case includes income from directly DREE induced employment, DREE linked employment and non-local government public sector employment oriented to external demand. The nonbasic payroll comprises the nonbasic category of the retail service sector and the total local government payroll since this activity is exclusively geared to serving local needs. Table IV summarizes employment and income by sector disaggregated into basic and nonbasic components. Summing the column totals in this case for income gives a basic payroll of $8,628,374 and a nonbasic payroll of $2,937,830.

TABLE IV

Technique B. Basic and Nonbasic

Sector Employment and Income, 1973/74

Sector	Employment Full Time Equivalent Jobs		Annual Payroll	
	Basic	Nonbasic	Basic	Nonbasic
Wood Products	272	-	2,099,160	-
i DREE Plants	238	-	1,599,360	-
ii DREE Logging	14	-	168,000	-
iii Contracted Logging	20	-	331,800	-
Public Sector	115	143	900,125	1,227,037
i Public Health, Welfare & Education	40	70	338,684	596,649
ii Non-local Government Administration	75*	49	561,441	368,559
iii Local Government	-	24	-	261,829
Oil Well Service Sector	357	-	4,146,912	-
Retail Service Sector	222	241	1,482,177	1,710,793
i DREE	43	-	210,000	-
ii Non DREE	170	241	1,206,657	1,710,793
iii DREE Linked	9	-	65,520	-

* includes 22 jobs (directly induced DREE public sector)

Sources: see Table in Appendix 4.

Basic employment totals 966 and nonbasic employment is 384. The income multiplier is thus $\frac{8,628,374 + 2,937,830}{8,628,374} = 1.34$ and the employment multiplier is $\frac{966 + 384}{966} = 1.397$

The alternative DREE multiplier was derived using the same procedure applied in the preceding section. The DREE payroll accounts for 27.52 per cent of the total basic payroll in this case and thus supports 106 nonbasic jobs. Therefore the multiplier is simply $\frac{324 + 106}{324} = 1.327$

The DREE Public Sector multiplier comprises directly induced employment (22 jobs) and 1.88 per cent of nonbasic employment (7 jobs) and is therefore $\frac{22 + 7}{22} = 1.318$. Table V summarizes the direct and indirect impact of the program.

TABLE V

Employment Impact of the Program

	Number of Jobs (Full Time Equivalent)
Direct DREE and linked industry	324
Public Sector	36
Nonbasic Sector	70[a]
	(113)[b]
Total employment attributable to the program	430[a]
	(543)[b]

a Using Technique A.

b Using Technique B.

Empirical Derivation of the DREE Multiplier

In addition to the estimation techniques employed above, the DREE multiplier may be derived empirically. From retail and service trade statistics provided by the Alberta Bureau of Statistics for 1971, a year prior to any impact of the program felt locally, employment in the service sector of the Slave Lake totalled 94 with a total annual payroll of $439,000. By March 1973 employment in the service sector amounted to 326 with a payroll of $1,950,468 annually.[15] If it is assumed that there were no other factors influencing economic growth in the town other than the program during the period 1971 to 1973 an additional 232 jobs in the service sector can be attributed indirectly to the effect of the program. The total impact of the program calculated on the basis of the data presented above is the sum of directly DREE induced and DREE linked employment (324), public sector employment related directly to the program (36) and 232 jobs induced indirectly in the service sector.[16] This produces a multiplier of 1.62 $\left(\frac{324 + 36 + 232}{324 + 36}\right)$ which is much higher than those derived from the basic nonbasic model employed in the previous sections.

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[15] Alberta Department of Municipal Affairs [7].

[16] 9 DREE linked service sector jobs were subtracted from the difference between total service sector employment for 1971 and for 1973.

Discussion of the Multipliers

1. Assumptions Adopted

The estimates obtained must be tempered by the assumptions inherent in the procedures used.

(a) With respect to the multipliers derived using the basic-nonbasic technique it is necessary to assume that the expenditure patterns of individuals employed in the basic sectors are identical and that no purchases are made by non-DREE industry or government from the nonbasic sector. Naturally the general restrictive assumptions of the basic-nonbasic model also apply.[17]

(b) For the method employing the source of funding for disaggregation of sectors into basic and nonbasic components it is assmed that expansion in the public sector is independent of expansion in other basic sectors except in the case of local government to the extent that this sector is supported by locally derived revenue.

(c) For the method employing the orientation of service employment as the criterion for classification it is assumed that expansion in the public sector is to some extent dependent on expansion in other basic sectors of the economy.

(d) With reference to the empirically derived multiplier it is necessary to assume absolute causality between service sector expansion and program induced expansion.

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[17] H.W. Richardson [44], pp. 247-254.

It can be seem from the Table that the size of the multiplier is significantly altered depending upon the type of procedure adopted. The difference between the community multiplier and DREE multipliers is less significant than differences within each group of multiplier estimates with respect to both income and employment. The DREE employment multipliers are smaller than the community employment multipliers which suggests that directly program induced expansion does not generate as significant an impact on the nonbasic sector as do the other basic sectors of the local economy. The community income multiplier is smaller than the employment multiplier which suggests that on average wages in the nonbasic sector are lower than average wages in the basic sector mainly as a result of the large number of low paid employment positions in the retail service sector.

Multipliers derived in other studies relating to recent growth in Slave Lake are summarized in Table VII below. The multiplier estimates derived by DREE are significantly higher than those obtained in this study. It would appear that in both cases the DREE estimates overstate the spin-off in terms of logging jobs and service jobs. The study undertaken for program evaluation DREE treated all employment not directly induced by DREE or linked to DREE activity as exclusively nonbasic. This type of classification is not consistent with the accepted theoretical and conceptual basis of the basic-nonbasic technique, since it fails to establish the role of the

2. The Size of the Multipliers

Table VI below presents multipliers derived using the basic-nonbasic technique.

TABLE VI

Multiplier Estimates

	Income	Employment
Community Multipliers:		
Funding source procedure	1.195	1.237
Service orientation procedure	1.340	1.397
DREE Multipliers:[1]		
Private Sector		1.194
Funding		1.327
Service orientation		
Public Sector		
Funding		1.194
Service Orientation		1.318
Empirical Technique		1.62
DREE Multiplier[2]		

N.B. 1 As noted in the text the income and employment multipliers are identical.

2 Wage inflation over the period 1971-73 makes it difficult to calculate a reliable income multiplier using the empirical technique.

public sector in terms of the basic-nonbasic dichotomy.

TABLE VII

Employment Multipliers

	Community	DREE
Municipal Affairs Economic Base Study 1973	1.31	-
Program Evaluation, DREE* 1974		1.52
Western Region DREE (Edmonton Office)**	-	1.5

* D. R. Webster , Report submitted to Program Evaluation, Western Region, DREE, 1974.

** 'Rule of thumb' estimate.

The community employment multiplier established by the Department of Municipal Affairs using a disaggregated economic base approach corresponds closely to the estimate obtained here.

The empirically derived DREE multiplier of 1.62 is clearly out of line with the other estimates. Apart from the obvious weakness of this type of estimation procedure there are two reasons which could account for the size of this multipler:

a. expansion in the service sector over the period 1972-73 could represent in part a lagged response to expansion in the public sector undertaken immediately prior to the implementation of the program;

b. in a rapid growth situation, particularly when this

occurs in a small centre which would thus tend to have a weakly developed service sector, income thresholds for goods and services will be crossed continuously producing rapid expansion of the service sector particularly with respect to low order functions which tend to generate a large number of low paid employment positions.

Analysis of the DREE Employment Multiplier

An aggregate statement of program impacts in terms of an employment multiplier has limited value since it says nothing about the intra-regional equity effects of the program. The objectives established for the program encompass four principal target groups; native peoples, long term residents of the region, the poor, and the hard core unemployed. The analysis which follows below seeks to determine the effectiveness of the program in delivering direct and indirect employment benefits to the prescribed groups noted above. The groups defined do not constitute mutually exclusive categories. For example native peoples tend to be established residents and there is a high incidence of welfare amongst this group. Many native people it could be assumed therefore are poor on the basis of socio-economic indicators traditionally used to define the underprivileged.

It was established in Chapter I that the hinterland constitutes the key problem area and therefore if the program is failing to reach hinterland residents, this implies that program benefits are failing to reach the target groups defined above.

1. The Impact of the Program on Native Peoples

It appears that directly DREE induced employment is integrating this target group into the mainstream of the labour force effectively. Native employment in the DREE assisted enterprises accounts for 24.6 per cent of the total number of employment positions created to date. Native workers tend to fill the lower paid positions but are probably making large relative gains since they tend to start from a very low income base, as former welfare recipients or seasonal workers engaged in fishing, hunting, logging and trapping activities. However, a number of the DREE firms have experienced some difficulties with native peoples especially absenteeism and high turnover which stem from problems of adjustment to an unfamiliar industrial work pattern and an urban life style.

DREE linked employment, which is basically related to logging activity, appears to be having a substantial impact on native residents in the hinterland. Native employment in logging operations linked to the DREE assisted wood products plants is estimated to account for 95 per cent of total employment in logging.[18] The bulk of the labour force is drawn from the Wabasca, Trout Lake and Loon Lake areas. All the positions are, however, seasonal. The average wage is estimated to be $600 per month which is inadequate to support many native households as a result of high dependency rates, and, therefore,

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[18] Questionnaire Survey, 1974.

some employees apparently drift back to the welfare payrolls during the period when logging activity is slack.

Indirect employment resulting from DREE activity appears to have had a less marked impact on natives. Within the service sector native employment accounts for an estimated 12.5 per cent of the total.[19] Furthermore native peoples occupy the lowest paid jobs in this sector. The average wage for natives is estimated at $5,192 compared to the average wage of $7,280.[20] It is suggested that natives lack the credentials to obtain higher paying positions although there may be other socio-economic barriers to the entry of natives into service sector employment.

2. The Impact of the Program on Long Term Residents

A major objective of the program is to ensure that established residents of the region gain access to employment benefits induced by DREE. Obviously the program cannot be considered to be performing well if employment benefits are being realised by individuals who are simply 'post facto' residents of the region. It was established that the program has induced considerable in-migration and positions are being filled by new residents. An estimated 46.3 per cent of the employment positions in the DREE firms are filled by individuals

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19 Questionnaire Survey, 1974.

20 Questionnaire Survey, 1974.

who have resided in the Special Area region for less than four years.[21] It is obvious that the existence of a large local pool of unemployed or underemployed labour does not necessarily ensure that this can be tapped effectively by new industry locating in a depressed region since unemployed labour resources may be unsuitable to fill the types of positions created. In the case of the Special Area there is an additional problem that the pool of unemployed labour is distributed throughout the hinterland and therefore there is a problem of accessibility to Mitsue Industrial Park, the node of industrial activity induced by DREE.

A similar situation exists with respect to indirectly induced employment attributable to the DREE program. The number of employment positions in the service sector held by short term residents, that is individuals who have resided in the Special Area for less than four years accounts for 42.1 per cent of total employment.[22] The high proportion of in-migration to the Special Area induced is obviously undesirable since it is clear that prescribed target groups within the Special Area are being bypassed in terms of employment benefits. However, heavy in-migration in the short run has been necessary to prevent operational bottlenecks developing in the DREE induced firms. With respect to the Special Area it is clear

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21 Data supplied by D.R. Webster.

22 Data supplied by D.R. Webster.

that skilled labour was unavailable from the local pool of unemployed labour resources. The gains obtained in terms of dampening operational snags must be offset against pressure on housing, health, educational and local government services resulting from heavy in-migration.

3. The Impact of the Program on the Hard Core Unemployed

Evidence for the impact of the program on the welfare case load is indirect. With reference to Figure 6 it is evident that the incidence of welfare within the Special Area is highest in the hinterland of Slave Lake. The total case load has declined markedly since the inception of the DREE program from a peak caseload of 332 in June 1971 to a low of 220 by March 1973. Fluctuations in the case load tend to support the suggestion made earlier that seasonal logging employees return to the welfare rolls during the slack period from April to October in the logging industry. Obviously it is difficult to establish causality from the available data since factors other than DREE activity may have influenced the decline in the incidence of welfare. An alternative explanation is that out-migration from the Special Area has contributed to the trend observed. However, native peoples who comprise the bulk of the hinterland population tend to be geographically immobile, therefore it would be wrong to play down the role of the program in the reduction of the welfare caseload.

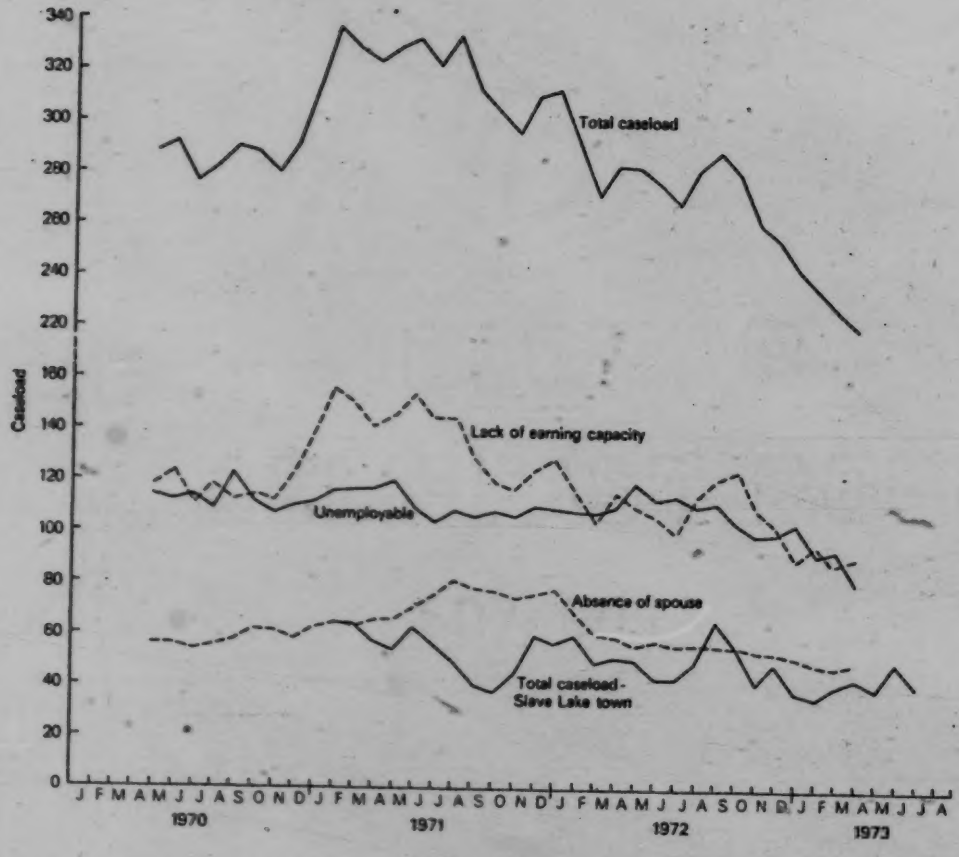

Figure 6
PUBLIC ASSISTANCE CASELOAD
SLAVE LAKE REGION

Source: Slave Lake Regional Office, and Research and Planning Section, Alberta Dept. of Health and Social Development
Supplied by Provincial Planning Branch, Alberta Dept. of Municipal Affairs

4. The Spatial Impact of the Program

It has been established that if the program is to have a significant impact on the economic well-being of Special Area residents, the benefits produced by DREE induced activities must diffuse into the hinterland surrounding the Slave Lake/ Mitsue Industrial Park growth centre, given that intra-regional mobility is low. The developmental strategy adopted by DREE seeks to stimulate a real wide expansion by concentrating industrial activity in selected growth centres. An attempt was made, therefore, to establish the extent to which this strategy has been successful with respect to developmental efforts in the Slave Lake area. The spatial impact of the program in terms of the distribution of employment and income benefits is summarized in Tables VIII and IX.

It is emphasized that the data presented is subject to a number of qualifications. For example, no account is taken of the fact that employment positions held by hinterland residents may fall into various income categories. That is, it is assumed all positions fall into the average wage bracket. In addition, it is assumed that the spatial incidence of indirectly DREE induced service employment corresponds to the spatial incidence of positions in the service sector as a whole. However the data do indicate in a general way the significance of spread effects induced by the program and this provides some useful insights into the effectiveness of the growth centre strategy as a developmental tool. The subject of spread effects

TABLE VIII

Spatial Impact of the Program

(Full Time Job Equivalents)

Sectors	Slave Lake	Wide-water Wagner	Canyon Creek	Kinuso	Smith	Faust	Slave Lake Rural Area	Wabasca, Desmerais, Trout Lake Areas
Wood Products								
(1) DREE Plants	196	6	6	6	12	-	6	6
(2) DREE Logging	2	-	-	-	-	-	-	32
Service								
(1) DREE	39	-	1	3	-	-	-	-
(2) DREE Induced	103	4	3	1	2	=	=	=
TOTAL	340	10	10	10	14	-	6	38

Source: Logging data from pers. comm. with H. Gullion, Slave Lake Logging Contractor; DREE data from Alberta Department of Municipal Affairs.

has received considerable attention in the theoretical literature but little empirical evidence has been presented to establish the extent to which spread effects occur.

The most obvious conclusion to be drawn from a cursory examination of the tables presented reveals that the spatial incidence of direct and indirect program benefits to the hinterland are limited and that the spatial impact of the program is concentrated heavily in the growth centre of Slave Lake. A closer examination reveals that spread effects induced

TABLE IX

Spatial Impact of the Program

(In terms of Income)

Sectors	Slave Lake	Wide-water Wagner	Canyon Creek	Kinuso	Smith	Faust	Slave Lake Rural Area	Wabasca, Desmerais, Trout Lake Areas
Wood Products								
(1) DREE Plants	1,319,472	39,984	39,984	39,984	79,968	-	39,984	39,984
(2) DREE Logging	24,990	-	-	-	-	-	-	474,810
Service		-		14,490		-		
(1) DREE	190,470		4,830		-		-	-
(2) DREE Induced	749,840	29,120	21,840	7,280	14,560	-	-	-
TOTAL	2,284,772	69,104	66,654	61,754	94,528	-	39,984	514,794

Source: Prorated from sources shown in Appendix 4.

by DREE activity appear to be directly proportional to the size of outlying communities within the hinterland and inversely proportional to the distance of these centres from Slave Lake, except in the case of logging activity. The total number of jobs attributable directly and indirectly to the program is 428 of which 340 (79.4 per cent) are located in Slave Lake town, 50 (11.7 per cent) in the immediate tributary area of the town, and 38 (8.9 per cent) in the peripheral part of the hinterland within the Special Area. The local impact of the injection of income earned by employees residing in the

tributary area is difficult to establish. Although residents of the hinterland exhibit a high propensity to consume low order good locally it is not clear whether the additional input of basic funds, that is wages and salaries earned, is sufficiently large to generate significant multiplier effects locally.[23] Local multiplier effects also tend to be dampened by the high propensity of hinterland residents to consume higher order goods and services non-locally. An interesting point to note regarding the spatial structure of income circulation within the tributary area is that there appears to be a substantial flow of funds back to Slave Lake through consumption expenditures which thus contribute further to employment expansion in the growth centre.

The observations made above tend to support the conclusions drawn on the basic of theoretical arguments regarding the weakness of induced spread effects. However, given the weakly developed central place structure within the Special Area, the dispersed nature of the hinterland population, and the small size of the growth centres selected by DREE (High Prairie and Slave Lake), it would seem to be a difficult task to induce significant spread effects in this type of situation. Therefore it can only be concluded that an effective growth centre strategy in a resource frontier context must be based on policy of encouraging intra-regional migration.

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[23] Alberta Department of Municipal Affairs [6].

Incidence Multipliers

This part of the analysis is concerned with calculating the multiplier income impact of the DREE Program to specific income groups using the Keynesian-type incidence multiplier model introduced earlier in this chapter.[24] The simulation of program impacts were based on a general community model, and thus it is assumed that individuals employed indirectly DREE induced activities exhibit expenditure patterns identical to individuals engaged in other sectors. A modification to the original model was made to take account of the fact that certain individuals received their income in a given income group and participate in the expenditures of households classified in a higher income group.[25]

An examination of household employment revealed that 48 per cent of households in the sample had two or more persons working either full-time, part time or seasonally. Within this group 16 per cent had three or more persons employed. Typical scenarios include the husband and wife team operating a small business, the wife working in lower paid jobs to boost the family pay packet and the professional husband and wife team. The effects of inflation, the increasing independence of women and the fact that Slave Lake is regarded as a place to make

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[24] A.L. Silver [46].

[25] P.R. Haddad [32], p. 34.

money and advance up the socio-economic scale appear to be important factors influencing household employment. It should be noted that employment opportunities for women are largely restricted to lower paying jobs in the service sector and public sector. However, as a result of the critical labour shortage in the region, women are being employed in less traditional and more remunerative occupations in the wood products sector. Although average household income is high, this must be offset against the high cost of living in Slave Lake, high dependency rates and the seasonality of certain employment positions. The two factors last mentioned apply especially to native peoples.

The analysis thus relates to the welfare of individuals and their families. The disadvantage of this approach is that household income may vary within and between income classes. The data required to construct the multiplier are presented below.

Table X presents the estimates of households' distribution of consumption expenditures over categories of commodities and services disaggregated by income group. These data were obtained from the 1969 Statistics Canada family expenditure survey.

Table XI shows the estimates of the propensity to consume locally disaggregated by commodity and household income groups.

TABLE X

Percentage Distribution of Consumer Expenditures by Commodity Group and Income Group*

Income group	Commodity group** 1	2	3	4	5	6	7	8
Less than $5,999 (Low)	.38	.19	.06	.08	.02	.12	.04	.01
$5,999 - $11,999 (Low-Middle)	.32	.17	.06	.08	.02	.13	.04	.03
$11,999 - $17,999 (High Middle)	.26	.14	.06	.08	.02	.15	.05	.05
More than $17,999 (High)	.10	.11	.05	.08	.02	.15	.05	.06

* Incomes were discounted back to the end of 1969 to allow for inflation and bring the expenditures of the income groups defined above into line with the decline in the purchasing power of the dollar.

** Commodity Groups:

1. Food, household operation, tobacco and alcoholic beverages
2. Shelter
3. Furniture and appliances
4. Clothing
5. Personal care
6. Travel and transport
7. Entertainment
8. Personal security

Source: Statistics Canada Family Expenditure in Canada 1969, Vol II - Regions. Catalogue 62-536 Occasional, Table 45 Expenditures by family income. All urbanization classes (Prairie Provinces), pp. 94 - 95.

TABLE XI

Percentage of Goods and Services Consumed Locally*

Income group	Commodity Group 1	2	3	4	5	6	7	8
Low	1.00	1.00	.39	.75	1.00	.46	.72	1.00
Low-Middle	.94	1.00	.31	.57	.83	.57	.46	..66
High-Middle	.97	1.00	.32	.48	.85	.42	.56	.55
High	.89	1.00	.25	.55	.75	.44	.56	.50

* It was assumed that all rental, mortgage and utilities payments are made locally.

Source: Questionnaire survey 1974.

The patterns revealed in Table XI are generally in line with theoretical arguments relating to spatial consumption patterns. That is, lower income groups tend to exhibit a lower propensity to import goods and services than high income groups and low order goods and service tend to be purchased locally. The propensities estimated are, however, higher than might be expected for a small community offering a restricted choice of goods and services. This suggests that households in the community demand a relatively unsophisticated package of goods and services which can be obtained locally and, or , consumers are unwilling to travel to higher order centres because of the time and money costs involved. That is, consumers are forced to make a trade-off between the wider choice and savings

obtained in shopping in a higher order centre and the savings on travel time and costs by shopping locally. This represents a classic case of spatial monopoly which is typical of frontier resource processing communities.

TABLE XII

(Matrix $_{L}C$) Probability that a Dollar Earned by Income Group i is spent Locally on Commodity k

Income group	Commodity group 1	2	3	4	5	6	7	8
Low	.380	.190	.023	.060	.020	.055	.029	.010
Low-Middle	.301	.170	.019	.046	.017	.074	.018	.020
High-Middle	.253	.140	.019	.039	.017	.063	.028	.027
High	.170	.110	.012	.044	.015	.067	.028	.030

Table XII is the product of Table X and Table XI and gives the probability that a dollar earned by income group i is spent locally on commodity k, which forms a matrix $_{L}C$. The distribution and the proportion of sales going to local value added is indicated in Table XIII. The distribution of earnings in the service sector indicates that the majority of employees fall into the low-middle household income groups. However there are a substantial number of individuals belonging to the high-middle and high income groups. Those groups are defined in the table. Although there are a large number of low paying positions in the service sector few of these individuals fall

into the low household income category. The product of matrix $_{L}C$ and Table XIII forms a matrix $_{L}A$ (Table XLV) which expresses the probability that a dollar of sales in commodity sector k is received as earnings by income group j locally. The matrix $_{L}P$ (Table XV) which is the product of $_{L}C$ and $_{L}A$, expresses the probability that a dollar spent locally by income group i is earned locally by income group j. The inverse of the $_{L}P$ Matrix is the matrix of incidence multipliers, K (Table XVI).[26] The derivation of the K matrix has been discussed earlier. The $_{L}P$ matrix indicates that 25 cents of a dollar spent by the low income group remains within the community, 23 cents for the low-middle income group, 20 cents for the high-middle income group, and 17 cents for the high income group. It is interesting to note that approximately 7 per cent of the low income group's local expenditures are earned locally by the high income group. Conversely, 2 per cent of the local expenditures by the high income group are earned locally by the low income group.[27]

The K matrix indicates that from every dollar earned directly by the low income group, 14 cents of income is earned

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[26] Matrix operations were performed on a computer using the APL programming language.

[27] In order to determine the percentage of income earned directly from group i by group j the appropriate element of row j in the LP matrix is divided by the sum of row i of local consumption coefficients in the matrix $_{L}C$ 100.

TABLE XIII

Percentage of Sales Going to Local Value Added by Sector and Distribution of Earnings by Income Group*

Income group	Commodity sector 1	2	3	4	5	6	7	8
Low	.054	-	-	-	-	-	-	-
Low-Middle	.446	-	-	-	-	-	-	-
High-Middle	.297	-	-	-	-	-	-	-
High	.203	-	-	-	-	-	-	-
Local value added to sales ratio	.175	.290	.227	.180	.232	.206	.207	.300

* It was assumed that the distribution of earnings amongst household income groups is identical for all commodity sectors.

** Wages, salaries and net profit.

Source: Questionnaire Survey of Service firms, 1974 (Appendix 3).

indirectly by the low-middle income group, 10 cents by the high-middle income group, and 6 cents by the high income group. However the low income group earns only one cent of indirect income from each of the three higher income groups' direct earnings. It is interesting to note further that if an identity matrix is substracted from the K matrix the percentage distribution of elements in each column are equal. Thus the incidence of indirect income benefits is independent of the incidence of direct income benefits.

TABLE XIV

(Matrix $_{L}A$) Probability that a Dollar of Sales in Commodity Sector k is Earned Locally by Income Group i

Commodity group	Income Group Low	Low-Middle	High-Middle	High
1.	.0135	.114	.0743	.0506
2.	.0254	.2095	.1396	.0952
3.	.0178	.1471	.0980	.0668
4.	.0162	.1337	.0891	.0608
5.	.0162	.1337	.0891	.0608
6.	.0243	.2006	.1337	.0912
7.	.0178	.1471	.0980	.0669
8.	.0227	.1872	.1248	.0851

TABLE XV

(Matrix $_{L}P$) Probability that a Dollar Spent by Income Group i is Earned Locally by Income Group j

From	To Low	Low-Middle	High-Middle	High
Low	.0137	.1134	.0756	.0515
Low-Middle	.0123	.1016	.0677	.0462
High-Middle	.0109	.0896	.0597	.0407
High	.0091	.0748	.0499	.0340

TABLE XVI

(Matrix K) Incidence Multipliers

1.0174	0.0156	0.0137	0.0115
0.1434	1.1284	0.1133	0.0946
0.0956	0.0856	1.0755	0.0630
0.0651	0.0584	0.0515	1.0430

In every case 5.4 per cent of the indirect benefits go to the low income group, 44.6 per cent to the low-middle group, 29.7 per cent to the high-middle group and 20.2 per cent to the high income group. Summing across the rows of the K matrix gives the number of times a dollar entering the hands of each income group circulates within the local economy before 'leaking' out (Table XVII).

TABLE XVII

Income Group	Direct plus Indirect Income
K_1	1.32
K_2	1.29
K_3	1.25
K_4	1.21

The significance of the incidence multipliers can be shown by using the K matrix to generate hypothetical aggregate DREE multipliers. The directly DREE induced payroll was distributed amongst the four income groups as shown in Table XVIII. The vectors X_1, X_2, and X_3 were multiplied by the K matrix giving three vectors Y_1, Y_2, and Y_3 which represent the distribution of direct and indirect income benefits (Table XIX). The hypothetical aggregate DREE multipliers are derived by summing the columns of the Y vectors and by dividing the total by the directly DREE induced payroll. The corresponding multipliers are 1.27, 1.30 and 1.25. Therefore it is clear that the size of the aggregate multiplier depends on the incidence of direct benefits, and increases as the proportion of income benefits to the low income group increases.

TABLE XVIII

Hypothetical Distributions of the Directly DREE Induced Payroll Amongst Income Groups

Income Group	X_1* $	%	X_2 $	%	X_3 $	%
Low	96,118	5	961,180	50	19,224	1
Low-Middle	922,733	48	672,826	35	461,366	24
High-Middle	672,826	35	192,236	15	961,180	50
High	230,683	12	96,118	5	480,590	25
Total Direct Benefits	1,922,360		1,922,360		1,922,360	

* This case approximates the structure of income distribution for the community of Slave Lake.

TABLE XIX

Hypothetical Distributions of the Directly and Indirectly DREE Induced Payroll Amongst Income Groups

Income group	$	Y_1 %	$	Y_2 %	$	Y_3 %
Low	124,034	5.1	992,094	39.8	45,445	1.9
Low-Middle	1,153,089	47.3	927,919	37.2	677,740	28.1
High-Middle	826,377	33.9	362,278	14.5	1,105,409	45.9
High	335,357	13.7	212,030	8.5	578,911	24.0
Total direct and indirect benefits	2,438,857		2,494,321		2,407,505	

Induced Public Investment[28]

Secondary investment in social overhead capital induced by expansion related to DREE incentives activity in the Special Area, which has focused on Slave Lake, has been small since the basic infrastructure put in place under the program is sufficient to service a population of 5,000. Thus induced investment is likely to be sluggish until demand bumps up against existing capacity. On the basis of population projections[29] for the

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[28] Pers. comms. with federal and provincial government departments, 1973.

[29] Alberta Department of Municipal Affairs [8], p. 52.

town of Slave Lake this 'slack' is unlikely to be taken up until 1976 or 1978.

The major induced investment in infrastructure relates to the expansion of the telecommunications system, undertaken by Alberta Government Telephones during the period 1970-73 involving capital expenditures totalling $217,222.

The Impact of Program Related Construction Activity[30]

Construction activity related to program funded infrastructure projects is not associated with a permanent increase in income or employment and is therefore of limited significance in terms of the multiplier impact of the program. However, this activity represents an integral part of the developmental effort related to the DREE program and should therefore be considered. The impact is extremely difficult to establish in terms of the number of jobs created and income generated locally. Therefore rather than attempting to quantify the impact of construction activity some points of interest regarding the degree of involvement of local labor and entrepreneurs in infrastructure projects will be discussed briefly.

All major infrastructure projects in the Slave Lake area were undertaken by contractors based in either Edmonton or Calgary. Construction materials, equipment, fuel, skilled and semi-skilled labor were, by and large, obtained from non-local sources. More surprisingly, contractors were unable

[30] Pers. comms. with contractors engaged on major infrastructure projects 1974.

to obtain sufficient unskilled labor locally. The use of local labor is advantageous to contractors since it reduces their outlay or food and accomodation to support crews hired non-locally. The lack of local response to casual employment opportunities can probably be explained in terms of the concentration of construction activity in Slave Lake, since the unemployed or underemployed pool of labor is dispersed throughout the hinterland and therefore it is unlikely that a significant 'commuter shed' effect would be produced. Therefore the main local impact of program related infrastructure construction would be through expenditures for food and accomodation and spending by construction workers. However, this impact could not be quantified because of the difficulties involved in obtaining this type of information.

Employment Projections

Projections of indirectly DREE induced employment were derived for 1974, 1975 and 1976 using the multipliers determined previously in this study applied to forecasted job creation in the DREE wood products sector.[31] It can be seen from Table XX that direct DREE induced employment is increasingly concentrated in the growth centre over time. This is explained in terms of the rapid fall off in logging jobs located in the hinterland relative to plant jobs located in Slave Lake/Mitsue.

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[31] Alberta Department of Advanced Education [1].

TABLE XX

Employment Projections

Employment	1974	1975	1976
DREE Program Jobs			
Wood Products (Plants)	178	100	110
Wood Products (Logging)	126	55	35
Total	304	155	145
DREE Employees resident in Growth Centre (Slave Lake)			
Wood Products (Plants)	142	80	88
Wood Products (Logging)	6	3	2
Total	148	83	90
DREE Employees resident in Hinterland			
Wood Products (Plants)	36	20	22
Wood Products (Logging)	120	52	33
Total	156	72	55

	(2) Low	High	Low	High	Low	High
(1) In Indirectly Induced Employment						
Employment in Growth Center (Slave Lake)(3)	53	89	27	46	25	42
Employment in Hinterland	6	10	3	5	3	5
Total	59	99	30	51	28	47

Source: Multipliers derived and Alberta Department of Advanced Education [1].

(1) Projections using total employment projections for DREE employees in Slave Lake and Hinterland for Plants and Logging jobs;

(2) For the low projections the multiplier of 1.194 and for the high projection the multiplier of 1.327 was used.

(3) Growth Centre Employment location factors obtained from Table VIII:
   i. DREE Plant 0.9
   ii. DREE Logging 0.05
   iii. Indirect Induced jobs 0.8

N.B. Lag time on induced employment assumed to be less than one year.

The projections for indirectly DREE induced employment are subject to a variation of approximately 70 per cent which results from the size of the multiplier used, even assuming a stable pattern of growth. It should be remembered that the multiplier refers to incremental, that is short run, change within a fixed output capacity, in this case represented by forecasted DREE induced activity, and does not allow for structural changes with long run implication for growth.

The Impact on Local Government

The concentration of developmental efforts by DREE in Slave Lake/Mitsue Industrial Park has put an enormous strain on the fiscal capacity of the municipality despite federal/provincial cost-sharing programs to assist in the financing of basic social overhead capital. As a direct result of the external stimulus to growth provided by DREE the per capita debt load of the town has been pushed to the point where further debt financing has been suspended by the Local Authorities Board of Alberta.[32] The imposition of this constraint is obviously serious since forecasted population growth over the period 1974-1976 will rapidly put pressure on existing infrastructure and service capacity, effectively dampening further development.[33] The current pressure on the existing tax

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[32] The per capita debt load of the town is the highest in the province, approaching $800.

[33] Alberta Department of Municipal Affairs [8], p. 52.

structure of the town constitutes a critical problem and will force a change in the structure of local government unless additional financing is made available from federal/provincial sources. This is unlikely in the near future unless radical policy changes occur. A number of proposals to deal with the fiscal difficulties of the town will be presented and discussed in the program evaluation section (Chapter IV).

The direct benefit to the town from industry located at Mitsue Industrial Park is limited since the site lies outside the town boundaries. The town of Slave Lake receives a $40 per capital grant from the Improvement District for each employee and family member resident in the town but employed in industry located outside the town. The second source of income is from sales of gas and water supplies by local government to the plants located at Mitsue. However future increases in these sources of revenue will not significantly influence the town's liquidity situation. The current situation in which the town has inadequate financial resources to meet the additional debt changes required to expand municipal facilities suggest that DREE did not think through very clearly the ramifications of basing a growth centre strategy on a small scale centre with a weak fiscal position.

CHAPTER IV

POLICY ANALYSIS AND RECOMMENDATIONS

In this chapter the impact of the program will be evaluated to assess the effectiveness of current policy. In addition certain regional development policy issues with wider implications will be considered.

The multiplier impact of the DREE program on income and employment stimulates short run socio-economic adjustments which should be of concern to the policy maker. In a disequilibrium situation the multiplier process is complicated by reaction lags bottlenecks and, or excess capacity in the service sector and therefore secondary induced effects are difficult to estimate. The multiplier model is thus not a wholly satisfactory tool for the purposes of policy analysis. It is surprising in view of the significance which DREE attaches to the multiplier mechanism that few attempts have been made to establish the multiplier effects of DREE programs. 'Rule of thumb' multiplier estimates applied by DREE appear to overstate the impact of DREE induced development. Applying DREE's 'rule of thumb' multiplier of 1.5 and the low estimate of 1.194 derived here to directly induced DREE employment, generates a discrepancy of 25 per cent with respect to indirectly induced employment. Obviously careful attention should be paid to the construction of multipliers for estimating employment impact if these are to be used to assist in decision making. If the multiplier is an over estimate, this could result in the

provision of excess capacity with respect to social overhead capital and public services, and could be misleading if used to calculate indirect program benefits for the purposes of cost benefit analysis.

1. The first recommendation therefore is that specific multiplier impact studies be undertaken to estimate the secondary effects of developmental programs administered by DREE.

The policy ramifications of relying on the multiplier process to act as a socio-economic adjustment mechanism as DREE apparently does, requires some consideration. As a result of the short run complications mentioned above, there will tend to be a lag before impacts work themselves out. However, it has been shown that the distributional effects of the multiplier have more serious implications for the creation of secondary employment benefits and the incidence of income benefits over the long run.

Assuming that the incidence multiplier model simulates the income impact of the DREE program reasonably well, the successful targeting of program income benefits to the lower income groups, representing the disadvantaged poor, will generate large local multiplier effects. However, it is not necessarily the case that local income multiplier effects generated by spending out of the directly DREE induced payroll will contribute to a proportional expansion of service sector employment.

The reason for this is that the indirect earnings of the high income group were shown from the simulation model to increase with direct gains made by the low income group, and thus increased expenditures out of the directly DREE induced payroll are likely to accrue as additional earnings to the higher income groups. Therefore, even if the DREE program is successful in raising the earnings of the poor directly, indirect benefits generated as a result will tend to raise the incomes of the rich. This effect stems from the structure of community income distribution and the structure of local income circulation, rather than from weaknesses in the program. However increased household demand stemming from the directly induced DREE payroll may bump up against employment capacity in the service sector, thus generating additional jobs and thereby creating a different structure of income distribution in the community.

It was shown in the analysis that the incidence of indirect program income benefits is independent of the incidence of direct program benefits, and therefore the multiplier process is not a redistributive mechanism. This suggests that measures such as negative income tax and guaranteed annual income may be the appropriate tools for reducing inequities in income distribution.

2. The second recommendation is therefore that in target regions local residents be encouraged to set up and participate in community retail services to aid in the more equitable distribution of profits, stemming from consumer

spending out of directly induced income benefits from programs. Particular efforts should be made to ensure that disadvantaged peoples are given the opportunity to become involved in such ventures, to ensure that multiplier effects benefit groups other than the established rich. This would encourage cumulative local multiplier effects since consumers would have an incentive to spend locally and the distribution of secondary benefits would be progressive.

It was established that there is a serious problem with respect to the delivery of employment benefits to prescribed target groups resident in the hinterland of the Special Area. This has resulted in heavy in-migration from outside the region. DREE's strategy has been to stimulate the diffusion of information concerning job opportunities in Slave Lake/Mitsue and to encourage migration from the hinterland to the growth centre. This strategy would seem to be valid since commuter shed effects are limited, given the distribution of population in the hinterland. However social programming aimed at integrating hinterland residents into the mainstream of economic activity induced by DREE, has not been synchronized effectively with DREE's industrial incentives activity. This could result in part from the fact that social programming has operated on the basis of a worst-first criterion, thus reducing the efficiency of the program with respect to the filling of directly DREE created employment positions by local disadvantaged

people.[1]

3. The third recommendation is, assuming that the target groups identified in the statement of program objectives wish to work in modes of industrial employment, incentives activity should be appropriately phased with respect to social programming to ensure that target groups are not bypassed by induced in-migration. In the short term this strategy would be less efficient than depending on in-migration to prevent bottlenecks with respect to labour supply. In the long-term, however, this would ensure more effective delivery of program benefits to specific target groups. Alternatively, social programming could be conducted on the basis of a strict maximum marginal gain criterion which implies trade-offs between gains in efficiency and equity.

It could be argued that the industrial structure created as a direct result of the DREE incentives program is building-in long term disparity, that is, the type of employment positions created tend to be low paying, and there is little scope for upward mobility within the directly DREE induced employment structure. Most of the positions are unskilled and semi-skilled and fall within a narrow income range. In addition most firms lack apprenticeship schemes and thus movement into skilled occupations from unskilled and semi-skilled occupations

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[1] Pers. comm., Social Worker, Opportunity Corps, Slave Lake Office, 1974.

within the firms is highly restricted. DREE incentives activity in the Special Area has been geared towards attracting labour intensive industry. This strategy is sound in terms of program employment creation objectives.

However, given the resource base of the region and its comparative advantage, the industrial structure induced is highly specialized, based on wood products. This industry is highly sensitive to recessionary and expansionary trends in the economy which thus makes it vulnerable, particularly during the initial stages of production. The impact of the current recession in the United States economy has been felt severely by wood products firms geared to supplying the U.S. construction industry. This would seem to suggest an urgent need for diversification. However diversification can only be extolled as a sound policy objective in frontier regions within the confines of the resource base and labour supply. With respect to the Slave Lake/Mitsue growth centre the scope for diversification would appear to be limited.

As previously noted linkages between the DREE assisted wood products firms, including entrepreneurial interaction, have not materialized. It appears that unrelated, small scale industrial projects retard entrepreneurial interaction and limit the potential for the development of future input-output linkages. This type of ad hoc developmental planning, it is suggested, is less effective than a 'socially engineered' industrial complex/growth centre type strategy, such as the

New Brunswick industrial complex being established. Some of the advantages of this type of development are noted below:

1. Internal diversification could be built into the project thus minimizing the effects of market fluctuations;

2. the project could be effectively synchronized with social programming and the provision of social infrastructure thus minimizing bottlenecks;

3. entrepreneurial interaction could be stimulated and growth mindedness diffused from the growth centre;

4. a large scale project would benefit from economies of scale and might generate external economies;

5. training schemes are usually an integral part of large scale operations, thus enhancing the possibility for upward mobility within the occupational structure created.

However there are a number of well known problems involved with this type of development:

1. the technological complexities of programming the production process;

2. the difficulty of establishing the feasibility of such large scale projects, particularly in peripheral locations;

3. the heavy requirements for skilled labour which would probably have to be imported;

4. a heavy dependence on a single raw material input at all stages in the production process.

The problems associated with a growth centre strategy based on small smale plants relate to the scheduling of projects,

the coordination of employment creation with social programming, difficulties in obtaining short term operating capital, high sensitivity to market fluctuations, bottlenecks, the lack of economies of scale and external economies. However these difficulties must be offset against certain advantages inherent in this approach, which include the possibilities for the direct involvement of local entrepreneurs in developmental programming, the relatively short time lag involved before impacts work themselves out (assuming that operational bottlenecks can be minimized) and the company town image is avoided.

4. The fourth recommendation is, assuming the normative framework of a growth centre policy, that industrial development be 'socially engineered' by involving entrepreneurs directly in the planning process to stimulate interaction between individuals and firms which would encourage innovation and future joint entrepreneurial endeavours, thus generating self sustaining growth 'in situ'. The scope for engineering this type of approach 'post facto' in the case of Slave Lake/ Mitsue is obviously limited.

It was established in Chapter III that few linkages exist between DREE induced activity and existing activities in the region apart from a backward linkage into the logging sector, which is weakly developed at present. A report by Drysdale carried out for the Alberta Department of Industry and Commerce, suggested a number of projects which could be

linked to the industrial structure induced by DREE at Mitsue.[2] These included a pulp mill, a particle board plant,[3] a wood working plant supplying building components for construction, a wood preservative plant and a maintenance plant servicing the wood products industries. However, no formal feasibility studies were conducted to establish the viability and timing of the proposed projects. Furthermore the projects suggested do not contribute to the goal of diversification outside of the wood products sector. The linkages between existing DREE wood products firms and the proposed projects would contribute to local multiplier effects, but this must be offset against the danger of over-specialization since downward multiplier effects induced by market fluctuations or recessionary trends would be transmitted throughout the local economy.

5. The fifth recommendation is that, although sufficient forest resources are available to expand output in the wood products sector and the potential for the development of linkages within this sector exists, the goal of diversification should be made central to future developmental efforts at Slave Lake/Mitsue. However, it is essential that the problems

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[2] Alberta Department of Industry, Trade and Commerce [4].

[3] This project was already in the 'pipeline' of the DREE program during 1973.

of local government financing and labour supply be solved before any further developmental efforts are pursued.

The problem of local government financing raises a number of policy issues which have implications for the future development of Slave Lake. Under existing legislation two major alternatives exist with respect to increasing the fiscal capacity of the town. These are:

1. applying for New Town status;
2. applying for Metroplex County status.[4]

Both types of changes in incorporation require organizational changes in the structure of local government. In the case of New Town status the Alberta Government would control the expenditure of government loaned funds through an appointed Board of Administrators. Thus the town would lose some of its autonomy. The reversion to Town status is dependent upon the rate of growth of the tax base and population as indicators of liquidity. There is a risk involved in adopting New Town status since the tax base may not expand sufficiently to meet the incurred debt load if expected economic growth fails to materialize, thus theoretically, the town could be bankrupted.

Metroplex County status involves extending the town's functional boundaries which thus extends the administrative and financial responsibilities of the municipality. The tax base would be expanded to include Mitsue Industrial Park and

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[4] Town of Slave Lake [30].

pipelines within the area. The Metroplex alternative raises two major problems:

1. the gains obtained by expanding the tax base could be out-weighed by the extension of financial and administrative responsibilities;

2. there would be potential conflict between urban and rural interests given the nature of population distribution and inequities in incomes within the area involved.

6. A further alternative which is not encompassed by existing legislation forms the basis of the sixth recommendation that direct joint federal/provincial grants be made available to towns in forced growth situations which are unable to finance expansion of local public sector output from traditional sources of financing in order to prevent serious dislocation of the local economy. If traditional sources of financing are to be relied on, DREE has a responsibility to establish the viability of centres in which developmental efforts are to be concentrated. It is suggested that the financing of the grant system recommended above be derived from government revenue from major resource development projects.

It has been shown that there are considerable difficulties in inducing development in the hinterland which result primarily from the nature of population distribution, the immobility of hinterland residents and the skeletal intra-regional road network. Essentially the policy maker is forced to make a decision between bringing jobs to people or

encouraging the movement of people to jobs which involves unavoidable trade-offs in efficiency and equity. At the inter-regional scale the policy of DREE has been to bring jobs to people. At the intra-regional scale in a resource frontier context, the lack of commuter shed effects would seem to imply a permanent movement of people to jobs. However, it is not necessary that individuals and their families be forced to make an immediate choice between traditional occupations and new modes of employment and between traditional places of residence and regional growth centres.

7. The seventh recommendation is that turnover be programmed to allow native peoples in the hinterland to shift frequently between the different modes of employment and life style. This policy would involve providing family accommodation at plant sites and transportation between hinterland settlements and the local growth centre. Some kind of contract between workers and employers would be required to ensure stability in employment. This type of policy would reduce pressure on local government financial resources and housing, place some measure of control on turnover and allow native peoples to benefit from developmental programs without forcing them to integrate into urban industrial society immediately or be bypassed.

There is a tendency for small communities in Alberta to scramble after industrial projects which appears to be

encouraged by the provincial government.[5] However most small communities lack the fiscal capacity to provide the basic infrastructure needed to support industrial development and population growth and thus are caught in a 'low level equilibrium trap.'

8. The eighth recommendation is therefore that traditional industrial-type regional development policy administered by DREE and provincial governments be based on middle order centres which have the basic package of public goods and services and thus do not require continuous public financing to sustain growth. However it is essential that regional growth centres be linked in a functional sense to the hinterland in order to maximize trickle down effects.

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[5] See [3].

CONCLUSION

The following discussion relates to the choice of technique employed in the analysis and to the attainment of study objectives. Some implications for regional development policy and theory are drawn from the results of the study.

The selection of techniques in multiplier impact analysis involves making a choice between ease of operationalization and theoretical rigour. Despite certain theoretical weaknesses the export base multiplier has obvious advantages from an operational point of view. The model is particularly appropriate when applied to small resource based economies in which the basic-nonbasic dichotomy is clear cut. However, when the public sector constitutes a major component of the regional economy, which was found to be the case in the Special Area, a difficult conceptual problem arises since it is not clear how to deal with this sector in terms of the export base model. It was shown that significant variations occur in the estimates of the multiplier depending on how the public sector is classified. The alternative classifications emplcyed were both theoretically sound and thus it is concluded that this problem does not have a single solution.

The export base model is too aggregative for estimating directly the differential multiplier impact of program benefits to specific groups. The analysis of the aggregate multiplier is thus not very satisfactory since it is difficult to establish the incidence of secondary benefits attributable

to the direct impact of the program. Thus, in order to trace this chain of impacts an incidence multiplier was employed. Basically the model simulated earnings dependencies between different income groups.

In terms of defining an aggregate multiplier, a main objective of the study, few difficulties were encountered and the simple export base model performed well. The objective of estimating the incidence of program benefits, which followed on from the task of calculating the aggregate multiplier, posed a more difficult problem and it was possible only to establish weakly the causal relationships between direct and indirect program impacts. However, the simulations of differential multiplier effects provided some significant insights into the distributive role of the multiplier mechanism which have important implications for regional development policy.

The secondary set of objectives in the evaluation related to an investigation of DREE induced inter-industry linkages and the impact of the program on the public sector.

The impact of the program on industrial linkage structure in the region received a cursory examination since it was established that linkage effects between DREE induced industries and between existing industries and the DREE assisted firms, had limited significance. The potential for linkages was given brief consideration since the entrepreneurs in the DREE assisted firms have shown little interest or enthusiasm in establishing integrated operations. A number of potential

projects which could be linked into the DREE induced industrial structure were considered. However this part of the analysis was necessarily speculative since the evaluation of the viability of such projects involves detailed feasability studies requiring inputs of time, funds and specialized knowledge which were not available for this study.

Secondary public sector investment induced by the program was established directly from federal and provincial departments administering programs not included in the Special Area agreement. Since the basic items of social overhead capital were provided for under the program, secondary public sector investment to date was found to be small. Thus the significance of the findings related to this objective of the study was limited.

Although the objective of establishing the impact of the program on the fiscal position and fiscal structure of local government was secondary to the analysis, this question is obviously of critical importance to future developmental efforts in the region. Some of the more obvious ramifications of generating 'explosive' growth in a small centre were discussed briefly. However, a detailed analysis of the problems of local government financing was beyond the scope of the study.

Attention in this study was focussed on the question of intra-regional equity with particular reference to the distributional impact of the multiplier process. There is virtually nothing on this subject in the regional development

literature. This represents a serious gap in view of the increasing concern with the targeting of program benefits to 'incidence' groups.

Two important results were obtained concerning the role of the multiplier as a distributive mechanism with respect to the incidence of benefits both spatially and between groups:

1. the multiplier effect will not cause a shift in the distribution of income in an equilibrium situation since the structure of income circulation operates in such a way as to maintain the existing structure of income distribution. However, if increased aggregate demand results in secondary employment creation, thus increasing the number of income recipients in the region, the structure of income distribution will be changed. In either case the incomes of the rich will tend to be increased indirectly as a result of raising those of the poor directly.

2. the multiplier process was found to have limited significance with respect to the spatial transmission of growth impulses to the hinterland from the growth centre in the case examined here.

Thus it is concluded that the multiplier process is a weak social adjustment mechanism and that more direct policy measures are required to attain equity objectives. Clearly more attention should be given to the targeting of <u>direct</u> program benefits. In addition the impact of transfer mechanisms such as the negative income tax and

quaranteed income on regional policy should be examined since these are likely to be introduced as part of national policy in Canada within the near future. The efficacy of the multiplier as an oerational tool to assist in decision-making is limited by the short run nature of the model and its restrictive assumptions. The main difficulty arises from the assumption that sufficient resources are available to allow output to expand. It is clearly unreasonable to assume for example, that a pool of unemployed labour in a backward region is capable of supplying industry induced to locate in the region with suitable workers. If the multiplier is to be employed effectively for predictive purposes there is a clear need to establish the capacity of the region involved to expand its output of goods and services through detailed resource inventory surveys.

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APPENDIX 1

HOUSEHOLD QUESTIONNAIRE

1. What is the size of your family household? _____

   (Note: Family household refers to all family members who live at this address.)

2. How many members of your family household are employed and what are their occupations?

   Occupations

   Full-time 1. ___ 2. ___ 3. ___ 4. ___ 5. ___

   Part-time 1. ___ 2. ___ 3. ___ 4. ___ 5. ___

3. If any of the above are not employed in Slave Lake town of Mitsue Lake Park please indicate their place of work.

   Occupations

   Full-time 1. ___ 2. ___ 3. ___ 4. ___ 5. ___

   Part-time 1. ___ 2. ___ 3. ___ 4. ___ 5. ___

4. Which of the following categories best describes your household's total take-home pay? That is income from all sources and after tax.

   (Hand slip to respondent. Seal returned slip in envelope.)

Less than 2,500 per year	_____	$10,000-$11,500 per year	_____
$2,500-$4,000 per year	_____	$11,500-$13,000 per year	_____
$4,000-$5,500 per year	_____	$13,000-$14,500 per year	_____
$5,500-$7,000 per year	_____	$14,500-$16,000 per year	_____
$7,000-$8,500 per year	_____	$16,000-$17,500 per year	_____
$8,500-$10,000 per year	_____	$17,500-$19,000 per year	_____
		More than $19,000	_____

5. Roughly how much do you expect to spend on the following goods and services each month and what percentage of these do you obtain in the communities listed on this card?

   (Hand card to respondent.)

	Estimated monthly expenditures	% Slave Lake	% Grande Prairie	% Westlock	% Peace River	% Edmonton	% Elsewhere (specify)	% Mail Order
1. Major grocery order	$____	—	—	—	—	—	—	—
2. Rent/Mortgage	$____	—	—	—	—	—	—	—
3. Clothing	$____	—	—	—	—	—	—	—
4. Dry Cleaning	$____	—	—	—	—	—	—	—
5. Vehicle maintenance and repair	$____	—	—	—	—	—	—	—
6. T.V. rental	$____	—	—	—	—	—	—	—
7. Personal care/ services	$____	—	—	—	—	—	—	—
8. Entertainment	$____	—	—	—	—	—	—	—
9. Insurance	$____	—	—	—	—	—	—	—

6. Which community <u>would</u> you visit to obtain the following goods and services? If you have recently purchases any of these items please indicate where you obtained them.

	Slave Lake	Grande Prairie	Westlock	Peace River	Edmonton	Elsewhere (specify)	Mail Order
1. Major appliances and furniture							
2. Vehicle							
3. Plumbing and heating services							
4. Jewellry							

APPENDIX 2

CONFIDENTIAL

BUSINESS QUESTIONNAIRE

Please return this questionnaire as soon as possible.

A. Classification

What are your firm's major products and/or services?

_____

B. Capital Expenditures

1. Please inducate the approximate value of capital expenditures for this business for the last two financial years. (April 1st 1971 - March 31st 1972/April 1st 1972 - March 31st 1973)

	1971-72	1972-73
i. New structures and additions to premises.	$ _____	$ _____
ii. New machinery and equipment (includes vehicles.)	$ _____	$ _____

2. What percentage of your capital expenditures on each of the above categories was paid to contractors and suppliers in the areas listed below? (Please complete for the 1972-73 financial year only.)

i. Payments for construction work: 1972-73

a. Slave Lake/Mitsue Lake _____% of total

b. Elsewhere in the Special Area* _____% of total

c. Other areas _____% of total

ii. Payments for new machinery and equipment: 1972-73

a. Slave Lake/Mitsue Lake _____% of total

b. Elsewhere in the Special Area* _____% of total

c. Other areas _____% of total

*See attached map (N.B. includes Grande Prairie)

3. Please indicate below the source from which this investment was funded (check more than one if appropriate).

i. Your firm's or parent company's funds _____

ii. A bank, finance company or similar institution _____

Location of funding institution _____

iii. Government source _____

4. What is the approximate insured value of premises, machinery, equipment and stock at present? $_____

C. Employment Requirements

1. How many full-time employees have you at present? _____

2. If you experience fluctuations in your employment needs please circle

i. Peak months: J F M A M J J A S O N D

ii. Slack months: J F M A M J J A S O N D

3. What was your wages and salaries bill for the 1972-73 financial year? $_____

D. Trade

1. Sales

i. Please indicate the approximate value of your sales for the last two financial years. (April 1st 1971 - March 31st 1972) (April 1st 1972 - March 31st 1973)

	1971-72	1972-73
Total Sales	$_____	$_____

ii. In column 1 below assign your sales in dollar terms to the buyers of your firm's products and/or services. Sales to wholesalers and retailers <u>for resale</u> should be indicated by writing wholesale or retail in the space to the right of the sales figure.

iii. In columns 2-4 estimate in each case the percentage of your sales (by value) going to buyers in the areas identified.

	1		2	3	4
	Total Sales		% to Slave Lake/ Mitsue Lake	% to elsewhere in the Special Area	% to other areas
<u>Households</u>	$_____		_____	_____	_____
<u>Government</u>	$_____		_____	_____	_____
<u>Firms</u> (Please describe, e.g., construction)		Wholesale/ retail			
1. _____	$_____	$_____	_____	_____	_____
2. _____	$_____	$_____	_____	_____	_____
3. _____	$_____	$_____	_____	_____	_____
4. _____	$_____	$_____	_____	_____	_____
5. _____	$_____	$_____	_____	_____	_____
6. _____	$_____	$_____	_____	_____	_____
7. _____	$_____	$_____	_____	_____	_____
8. _____	$_____	$_____	_____	_____	_____
9. _____	$_____	$_____	_____	_____	_____
10. _____	$_____	$_____	_____	_____	_____

*See attached map (N.B. includes Grande Prairie)

2. Purchases (Do not include capital expenditures)

i. Please inducate the approximate value of our business purchases for the last two financial years. (April 1st 1971 - March 31st, 1972) (April 1st 1972 - March 31st 1973)

	1971-72	1972-73
total purchases:	$_____	$_____

ii. In column 1 below indicate the value of your business purchases of major materials, parts, supplies and services. Purchases from wholesalers and retailers <u>for resale</u> should be indicated by writing wholesale or retail in the space to the right of the sales figure.

iii. In columns 2-4 estimate in each case the percentage of your purchases by value from suppliers in the areas identified.

	1		2	3	4
	Total purchases from	Wholesale/ retail	% from Slave Lake/ Mitsue Lake	% from elsewhere in the Special Area*	% from other areas
Raw materials e.g. Lumber (unsawn)					
1. _____	$_____	$_____	_____	_____	_____
2. _____	$_____	$_____	_____	_____	_____
3. _____	$_____	$_____	_____	_____	_____
4. _____	$_____	$_____	_____	_____	_____
Processed Materials e.g. cement, food, sawn lumber					
1. _____	$_____	$_____	_____	_____	_____
2. _____	$_____	$_____	_____	_____	_____
3. _____	$_____	$_____	_____	_____	_____
4. _____	$_____	$_____	_____	_____	_____

*See attached map (N.B. includes Grande Prairie)

	1	2	3	4
	Total purchases from Wholesale/ retail	% from Slave Lake/ Mitsue Lake	% from elsewhere in the Special Area*	% from other areas
Manufactured Materials e.g. Wire, Tools, pipes electrical products				
1.	$			
2.	$			
3.	$			
4.	$			
5.	$			
6.	$			
7.	$			
8.	$			
9.	$			
10.	$			
Fuel & Power - gas, electricity, petroleum, coal				
1.	$			
2.	$			
3.	$			
4.	$			
Services to production e.g. maintenance, repair, equipment rental				
1.	$			
2.	$			
3.	$			
4.	$			
5.	$			
6.	$			
7.	$			
8.	$			
Transportation services (Air, truck, road, pipeline)				
1.	$			
2.	$			
3.	$			
4.	$			

*See attached map (N.B. includes Grande Prairie)

	1	2	3	4
Services to business e.g. Accounting, legal & Consulting services, Laundry, cleaning, etc.	Total purchases from Wholesale/ retail	% from Slave Lake/ Mitsue Lake	% from elsewhere in the Special Area*	% from other areas
1.	$			
2.	$			
3.	$			
4.	$			
5.	$			
6.	$			
7.	$			
8.	$			

* See attached map (N.B. includes Grande Prairie)

APPENDIX B

QUESTIONNAIRE - RETAIL AND SERVICE ESTABLISHMENTS

1. Please list in the first column below your employees by occupational group (include employees who only work at certain times of the year.) In the second column estimate the average number of hours per week worked by these employees. In the third column estimate their earnings.

Employees by occupational group	Average hours per week worked	Monthly/weekly/ hourly wage rate (specify)
1.		$
2.		$
3.		$
4.		$
5.		$
6.		$
7.		$
8.		$
9.		$
10.		$

2. Estimate the percentage of your business's gross revenue accounted for by wages, salaries and net profit. _____%

3. Interview all employees listed above to determine the occupation and earnings of all other family members employed.

	(a)		(b)		(c)		(d)	
1.		$		$		$		$
2.		$		$		$		$
3.		$		$		$		$
4.		$		$		$		$
5.		$		$		$		$
6.		$		$		$		$
7.		$		$		$		$
8.		$		$		$		$
9.		$		$		$		$
10.		$		$		$		$

APPENDIX 4

EMPLOYMENT AND PAYROLL BY SECTOR:

SLAVE LAKE REGIONAL ECONOMY

Sector	Employment* Full-time	Part-time	Seasonal	Payroll**
Wood Products				
1. plants (DREE)[1]	234	-	16	1,599,360
2. logging (DREE)[2]	-	-	56	168,000
3. logging (DREE contracted)[3]	-	-	79	331,800
	234	-	151	2,099,160
Public Sector				
1. public health, welfare and education[4]	105	10	-	935,333
2. non-local government[5]	107(36)[6]	17	34	930,000
				(269,883)
3. local government[7]	24	1	-	261,829
	236	28	34	2,127,162
Oil well service[8]	270	62	226	4,146,912[1]
Retail/Service[9]				
1. DREE	38	11	-	210,000
2. Non-DREE	356	82	55	2,917,450
	394	93	55	3,127,450
TOTAL	1,096	172	466	11,290,684

Note: Figures in parentheses refer to the DREE-related public sector component.

*Sources:

1. Manpower Study: Slave Lake Area, Vol II. (1973)
2. A Directory of Primary Wood-Using Industries in West-Central Canada, 1973, Information Report NOR-X-83, Northern Forest Research Centre, Edmonton, Alberta, 1974.
3. Personal communications with manager of DREE assisted wood products firms.
4. Manpower Study.
5. Information supplied by Alberta Department of Municipal

Affairs, March 1973 from an economic base study of Slave Lake (in preparation) undertaken by Planning Research section, Provincial Planning Branch.

6. Personal communication with the Office of Program Coordination, August 1973.
7. Manpower Study.
8. Information supplied by Alberta Department of Muhicipal Affairs.
9. Ibid.

**Sources: Questionnaire survey and personal communication except:

1. Information supplied by D.R. Webster from a study undertaken for Program Evaluation, DREE (in preparation).

APPENDIX 5

APL Program To Determine Incidence Multipliers.

```
      LC1← .38 .19 .023 .06 .02 .055 .029 .01
      LC2← .301 .17 .019 .046 .017 .074 .018 .02
      LC3← .253 .14 .019 .039 .017 .063 .028 .027
      LC4← .17 .11 .012 .044 .015 .067 .028 .03

      LC← 4 8⍴ LC1,LC2,LC3,LC4

      LA1← .0135 .1114 .0743 .0506
      LA2← .0254 .2095 .1396 .0953
      LA3← .0128 .1471 .098 .0668
      LA4← .0162 .1337 .0891 .0608
      LA5← LA4
      LA6← .0243 .2006 .1337 .0912
      LA7← LA3
      LA8← .0227 .1872 .1248 .0851

      LA← 8 4⍴ LA1,LA2,LA3,LA4,LA5,LA6,LA7,LA8

      □←LP←LC+.×LA
0.0137411       0.1133872       0.0755835       0.0515396
0.0123129       0.1016006       0.0677254       0.0461844
0.0108591       0.0896073       0.0597302       0.0407315
0.0090659       0.0748115       0.0498658       0.0340076

      I← 4 4⍴ 1 0 0 0 0

      □←K←⌹(I-(⍉LP))
1.017373528     0.01556775036   0.01372970835   0.01146250872
0.1433609244    1.128458669     0.1132947164    0.09458761079
0.09556332925   0.08562840122   1.075519714     0.06304812302
0.06516459206   0.05839312544   0.05149895941   1.042997119
```